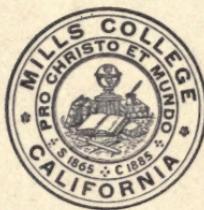


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F. 133

HEALTH AND BEAUTY

etch BY
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PREFACE.

HEALTH and beauty are closely allied, and nowhere so clearly as in the condition of the skin. A pure skin, being an important element of human beauty as well as of health, should therefore be a subject of much interest to mankind. The fundamental laws of health apply to this envelope of the body, the skin; with as much stringency as to parts that lie beneath it, all nourished by the blood coursing through every part of the body with greater or less efficacy according to whether or not they are in good condition from diet, ablution, and many other circumstances. The life of no organ can be considered apart from other components of the body. The skin is quick to reflect disorder of other portions of the organism. No wonder that this is so, for, as Herbert Spencer remarks, it is that surface by which we come in contact with the universe! A large element in personal beauty consists in the nature and condition of the skin. Excellence in these, associated with elegance of form and sprightliness of action, can even dispense with regularity of features in the production of harmonious and attractive bodily attributes, so it becomes apparent that, to some degree, we all have our looks under command.

In consequence of this and other facts, the author pur-
poses, in successive chapters, to point out to the reader the vari-
ous methods by which health may be influenced by climate, diet,
clothing, ventilation, bathing, and exercise. He will incidentally
call attention to the deleterious effects of certain habits, and
include brief descriptions of diseases that frequently invade the
skin, not neglecting, in this connection, mention of the eruptive
diseases of childhood. The diseases to which the hair and nails
are subject will here also receive attention. Finally, the legiti-
mate employment of cosmetics will be defined, and choice for-
mulæ given for their preparation.

(iii)

It is hardly necessary to add what should seem to everyone a matter of course, that the author is indebted for some of his material to distinguished writers on the above-mentioned themes, and to medical and pharmaceutical authorities of the highest class. This work, although written from a medical standpoint, will not overlook, but will expressly include æsthetic considerations, which nature itself presents in connection with the subject. In consequence, some space in it will be found devoted to discussion of the principles of beauty in various departments of art. As artists have seen beauty, they have depicted it, and in so doing, have aided the mass of men in recognizing its principles. As closely related to beauty, not in the abstract, but in the concrete, a chapter will be devoted to the influence of beauty in human society, illustrated, in the case of literature, by quotations drawn from works of poetry and fiction recognized by the whole world as standard.

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Itching piles or hæmorrhoids.	Freckles, blackheads, tan, etc.	feet, armpits, and other parts of the body.
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Oily or greasy skin,	Freckles, blackheads, tan, etc.	and irritation of the skin.
especially of the face.	Freckles, blackheads, tan, etc.	Pimples on the face.
Odorous or stinking sweat,	Freckles, blackheads, tan, etc.	Protection against
especially of the hands,	Freckles, blackheads, tan, etc.	insect bites.
feet, armpits, and other parts of the body.	Freckles, blackheads, tan, etc.	Redness of skin, sunburn,
Pimples, blotches, tetter,	Freckles, blackheads, tan, etc.	chafing.
and irritation of the skin.	Freckles, blackheads, tan, etc.	Red nose and cheeks.
Pimples on the face.	Freckles, blackheads, tan, etc.	Sores or ulcers of the skin.
Protection against	Freckles, blackheads, tan, etc.	Stings of insects.
insect bites.	Freckles, blackheads, tan, etc.	Stye-lotion.
Redness of skin, sunburn,	Freckles, blackheads, tan, etc.	Sunburn.
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HEALTH AND BEAUTY.

CHAPTER I.

THE SKIN AND COMPLEXION.

THE skin, although dense and firm, is, at the same time, a highly elastic membrane. It covers and protects the parts immediately beneath it, and is effective in maintaining bodily temperature equably, and also in preventing excessive evaporation from the interior of the body. Were it not for the presence of the skin, the loss of the watery constituents of the body would be excessive, its tissues would dry up, their vitality would be lost, and death would ensue. So, the health of the skin is intimately connected with the health of the general system. On the other hand, the normal activity of the body is essential to the proper nutrition and activity of the skin.

The nerves that enter the skin terminate in bulbous expansions, by means of which the individual is brought into one relation with the external world, that through the sense of touch. The skin is furnished with many glands, some of which render it soft and pliable, while others remove from it effete fluid and solid matters from the blood. It is divided into various layers. One of these is known as the *derma, cutis vera*, or true skin. Superposed on this are several thin layers, known collectively as either the cuticle, scarf-skin, or epidermis. The true skin is composed of a substance known to anatomists as connective tissue, because of its function of binding together other parts, as demonstrable by examination under the microscope. Connective tissue is universally distributed throughout the body. But it is modified in different parts as to its structure, so as to meet different conditions; all the time, however, retaining its

essential characteristics of structure. In the true skin, its fibers are so disposed as to form little bundles crossing one another obliquely, leaving between them interstices filled with a soft, fatty tissue, constituting the site of little blood-vessels, glands, and the roots of hairs.

It is now generally believed by physiologists, that some papillæ, or little protuberances of the skin, contain nerve-fibrils devoted exclusively to the sensation of touch and recognition of heat, cold, and pain. Other papillæ contain, instead of nerve-ends, the ends of blood-vessels. The blood-vessels of the body, exclusive of the skin, have no termination; they begin and end at the heart. The system prevails throughout the body. It is essentially the same in bone, brain, and all internal structures. Arteries diminish in size proportionately to their distance from the heart and the number of branches given off by them. Everywhere they are continuous with veins and the smallest of blood-vessels, known as capillaries, because they are hair-like in size. The blood from the head and upper extremities becomes impure from waste-products of the body, goes to the right side of the heart, after having departed from the left, by a single large blood-vessel; and that from the exterior and interior of the body, and from the lower limbs, by another large blood-vessel. Thence it passes through the lungs for purification, parts with its carbonic acid, returns to the left side of the heart as pure arterial blood, and again continues its round through all parts of the body. Some impurities, however, are removed by the lungs, liver, kidneys, and skin.

Papillæ are especially numerous upon those portions of the skin that are most closely connected with the sensation of touch, as on the tips of the fingers, the palms of the hands, the soles of the feet, and the toes. It has been computed, from microscopic examination, that, in some of these situations, there are about sixty thousand papillæ to the square inch.

In addition to the connective tissue, already described, is found with it a certain amount of substance known as yellow

elastic tissue. This is composed of fibers, thicker than those of connective tissue, having a faint yellow tint. As implied by its name, this tissue serves to communicate to the skin a notable elasticity.

Muscular fibers are also present in the skin. Some of these lie parallel with, and others obliquely to, the surface. These little muscles begin near the upper surface of the true skin and pass downward to the hair-follicles, the bulbs containing the root of the hair. When they contract, the papillary layer of the skin is pulled downward; the hair-follicles and contained hairs themselves are then necessarily forced to protrude above the surface. So comes about that occasional roughness of the skin, known as goose-flesh, produced from cold or from fear. Referred to fear, the hair is said to stand on end. Another consequence of the action of the cutaneous muscular fibers may manifest itself in the compression of the glands of the skin, resulting in the cold sweat of fear.

A gland is an aggregation of cells which has the power of forming from the blood-vessels matter known as secretion, or of modifying the constitution of the blood. The skin contains two kinds of glands, the sebaceous, or oil-glands, and the sudoriparous or sweat-glands. The oil-glands are imbedded in the substance of the skin. They are present in most parts of the surface of the body, but there are regions of it from which they are absent, the palms of the hands, the soles of the feet, and the ends of the fingers and toes. They are particularly numerous upon the hairy portions of the body, consequently very numerous on the scalp.

The sudoriparous or sweat-glands are of simpler construction than are the oil-glands. They consist of twisted tubes, situated in the connective tissue. These glands, much more numerous on some portions of the body than on others, are about a quarter of an inch in length, and reach the surface of the skin in undulating lines. They are most abundant on the palms of the hands and soles of the feet, there numbering from

twenty-five hundred to three thousand to the square inch; whereas, upon the back, the skin contains only about four hundred to five hundred sweat-glands to the square inch. It has been calculated that the aggregate length of these glands on the human body is over nine miles. Both sebaceous and sudoriparous glands are modified in structure and function in certain situations. A variety of the sudoriparous glands is found in the outer passage of the ear. In this region they become ceruminous glands, that is, glands secreting and excreting *cerumen*, or wax.

The lowest stratum of the scarf-skin is, owing to its constitutional softness, called the mucous layer. It is that in which the coloring matter is deposited. The color of all races of mankind depends upon the character and amount of the granules of pigment, or coloring matter, deposited in this layer. When this cuticle is removed, it is observable that even the color of the darkest race, the negro, is just like that of the white races. Passing by the two layers that are immediately superposed on the mucous layers, the fourth layer from the bottom, that is, the surface of the skin, deserves particular mention. It, the most superficial of all, the one that appeals to the eye with fineness and color, consists of a network of large, dry, hard, closely connected cells or scales. When they reach the surface, for they are generated by gradual modification from below, these cells or scales have lost most of their moisture by evaporation, and have also undergone chemical changes through which they have been converted into a substance similar to horn. This layer is, therefore, known as the corneous, or horny, layer of the skin. The horny layer of the scarf-skin plays the most prominent part in the production of the distinctive characteristics of a fine skin. As light strikes upon its surface, the rays are refracted and reflected, so as to produce what we know as brilliancy of complexion.

The scarf-skin varies in thickness in different parts of the body, in accordance to the various development of its layers in

those situations. It is thinnest upon the lips and face and thickest upon the palms of the hand and the soles of the feet. The horny layer notably varies in thickness according to its localities on the body. The development of the horny layer does not, moreover, always correspond with that of the softer layers below. Habitual manual labor thickens and hardens this outer horny layer, so that laborers have often been, in strict accuracy, called horny-handed sons of toil.

The true skin is very closely associated with the soft tissue below it, called subcutaneous connective tissue. Connective tissue has been here already sufficiently noted as to its loose structure. Subcutaneous connective tissue is still more loose in structure, its meshes are larger and contain more fat than does the connective tissue. Its fat is particularly abundant in certain situations. It is more developed in children and women than in men. It usually diminishes with advance of age, except, of course, in persons of an obese tendency. It is rapidly lost in severe fevers and in certain other wasting diseases.

The structure of the true skin differs in no essential particular from the tissues immediately beneath it. They all blend imperceptibly into one another, showing between them no strict lines of demarcation. The outer skin may therefore be justly regarded as a special modification or condensation of connective tissue. Thus modified, it finally contains muscular and elastic fibers and numerous glands, covered with a protective membrane furnished with hair and nails.

The mobility of the skin is dependent upon the size, abundance, and elasticity of the underlying fatty meshes. In certain situations, as around joints, where mobility of the skin is indispensable, the connective tissue is loose, and contains but little or no fat. The adaptation of the skin to its requirements is well expressed in the words of the ancient physician, Galen, who wrote, "Try if you can imagine a shoe made with half the skill that appears in the skin of the foot."

CHAPTER II.

THE APPENDAGES OF THE SKIN.

THE hair and the nails are appropriately called the appendages of the skin, because they are merely modifications of its uppermost layer, variously called the epidermis, the scarf-skin, and cuticle. The cross-section form of the hair varies somewhat among different races. In that of the Caucasian race it is so slightly oval in form as to approach the circular. Straight hair is indication of the fact that the tube which constitutes a hair has everywhere throughout its length a cross-section of the same size and form. The crinkly constitution of the hair of the Negro is owing to the fact that its cross-section varies continually through its length, causing it to bend sharply on itself throughout its course. The hair of the Indian, on the contrary, presents the opposite appearance, and for the reason already indicated, that its cross-section is singularly the same throughout its whole length. What is here said is clearly indicated by the microscope, which, with high power of magnification, exhibits not only this feature of the hair, but the granules of pigment contained in its tubes, and also the scales in it, with which its surface is so completely covered that it looks as if carefully tiled.

Hair-roots are lodged in bulbs called hair-follicles. These, of the form of a flask, are situated obliquely in the true skin. At the bottom of the hair-follicle is an oval body, called the hair papilla, which is the germ of a hair. Its structure is identical with the papillæ of the true skin. Hair, as well as the scarf-skin, is not furnished with blood-vessels. Its nourishment is derived chiefly from the capillaries contained in the hair-papillæ.

A hair consists of a free portion, called the shaft, extending beyond the surface of the skin; an embedded portion, or root,

contained within the hair-follicle; and an expanded portion, which rests upon and encloses the hair-papilla. The root is formed of a soft, central substance, known as the medullar, or pithy, and an outer layer, known as the cortical, or corklike substance. These two, in turn, are enclosed in an exquisitely fine membrane, known as the cuticle of the hair. This cuticle is composed of a single layer of scales slightly overlapping at their edges, and presenting the appearance, under the microscope, which has been already described.

Hair grows upon nearly every part of the body, the exceptions being the upper part of the eyelids, the lips, the palms of the hands, the soles of the feet, and a very few other situations. The hair is, especially on the crown of the head, arranged in spirals. When the cross-sections of the hairs differ throughout its length, they will, as already indicated, be curly or wavy. A striking instance of the effect of climate upon hair is mentioned by Sir Erasmus Wilson, taken, as follows, from Mr. St. John's "Travels in the Valley of the Nile:" "The effect of the climate of Egypt upon the hair is remarkable. My own beard, which, in Europe, was soft and silky, and almost straight, began, immediately upon my arrival at Alexandria, to curl, to grow crisp, strong, and coarse, and before I reached El-Souan, resembled horse-hair to the touch, and was all disposed in ringlets about the chin."

The fact is that hair is highly hygroscopic; that is, affectable by moisture. Every hair-dresser knows this. Mr. St. John experienced a singularly dry climate on the occasion mentioned. When he returned, by the way of Malta, his curly beard resumed its normal state, in the moist air of the Mediterranean.

The character of the hair evidently depends upon climate. When this influence has been asserted through thousands of years, its type becomes established as one of the characteristics of race. The inhabitants of northern climates have generally long, straight hair; those of southern and equatorial ones, wavy or wooly hair. Associated with this difference of condition in

hair is found difference in pigmentary constitution in it and in the color of skin and eyes. Northern peoples, as compared with southern peoples, are relatively blond. Where exceptions are found, it is doubtless owing to racial intermingling. After a few crosses, even the complexion and wool of the negro become, in the quadroon and octoroon, almost lost to sight.

A very great difference exists both in the abundance and the nature of the hair among different races. The Malays and the American Indians are distinguished by straight, black, coarse hair, abundantly growing upon the top of the head, but very scantily upon the face. Coarse, black hair, however, is common to the Indians of North and South America, of those inhabiting cold, temperate, and tropical regions. They are all, probably, immigrants from the Eastern continent. Microscopical examination has shown that the former Indians of Mexico, Central America, and Peru had the same kind of hair that the North and South American Indians of the present day possess. The natives of Australia have either straight or curly hair. A striking contrast presents itself between the scanty locks of the Mongolians and the hairiness of the Ainos, supposed to be descendants of the indigenous population of Japan. The Ainos are distinguished for their hirsute condition, but it has been much exaggerated. The scalp of the Bosjesman, of South Africa, exhibits the peculiarity of being covered by tufts of hair, standing apart like the little tussocks in a marsh. The hair is wiry and harsh to the touch, and bristles up on the head like a shoe-brush.

When the hair has reached the natural term of its existence, it falls out of the sheath formed by its follicles, and one to replace it immediately sprouts from the germ of the papilla. The thickness of the hair depends upon age and sex; its color, upon health and cutting. Repeated cutting increases the diameter of hairs, but decreases the length of their growth. So it is, naturally, in the process of dwarfing plants. Flaxen hair is the finest, and black hair the coarsest of all in constitution. The

usual term of the hair's extreme growth in length is from two to six years. Including both sexes, the length attained is from twenty to thirty-six inches. There are, however, cases in the female sex where the length attained is between five and six feet. The beard grows, on the average, at the rate of six and one-half inches per year.

The color of the hair depends upon the character and amount of the pigment deposited in the tubes which constitute its shafts. White hair is destitute of coloring matter. Grayness of hair is produced by the presence in hair-shafts of bubbles of air. The elasticity of hair is one of its remarkable characteristics. It can be stretched with care to considerably more than its normal length. If the tension be not maintained too long, it will, moreover, afterwards contract to nearly its former length. The number of hairs on the head varies indefinitely. Some examinations have placed them from eighty thousand to one hundred and twenty thousand in number. The hair is highly susceptible to the influence of static electricity. In a dry climate, friction will produce in the hair a crackling sound. Indeed, in a dry time, in an ordinary climate, this effect is frequently seen in combing the hair, when it is also observed to tend to stand on end.

The covering of the finger- and toe-tips, which we call nails, is formed of dense, horny plates. It grows out of a source called the *matrix*, and is lodged, at the back and sides, in a fold of the skin called the nail-groove. The depth of this groove is about the twelfth of an inch for the most of the fingers and toes, an eighth of an inch for the thumb, and a sixth of an inch for the great toe. The groove is deeper at the back than in front. The part of the nail that is contained in the groove is called the root, the surface upon which the nail rests is called the bed. The whitish half-moon at the base of the nail is called the *lunula*, or little moon.

The nail is nourished chiefly by its *matrix*, but also by its bed, and as it pushes forward with growth, it becomes thicker and thicker as it approaches its free edge.

The nails grow more rapidly in summer than in winter, and in childhood than in old age. The time required for the growth of the thumb-nail from the *matrix* to the free edge is about five months. It takes about four times as long for the great-toe nail to attain its full length. The white spots sometimes observed upon the finger-nails are indicative of blows which have affected injuriously the nourishment of the structure. Transverse grooves in the nails are produced by fevers and other serious illnesses.

A severe blow on a nail may cause it to become dark, and eventually to fall off, wholly or in part. If the *matrix* has not been seriously injured, a perfect nail will, in this case, be eventually produced, but when the *matrix* has been actually destroyed, the nail cannot be regenerated. The nail has the appearance, upon critical examination, of being composed, as it really is, of alternate columns, red and white in aspect. The forms of these correspond with longitudinal depressions of the nail-bed, the latter with the ridges of the nail-bed. "The quick" of the nail, as it is popularly called, is the nail-bed, so known on account of its exquisite sensitiveness.

The nail is translucent, and for that reason is of a rosy appearance when the blood of the bed is rich and abundant. When the blood becomes thin, in consequence of any disease, or of a low state of the system, the nail becomes pallid. The white color of the *lunula* is owing to the fact that the capillary blood-vessels are less abundant there than elsewhere in the bed of the nail. In a state of perfect health, the nails tend to be beautifully smooth and rosy. Both color and luster are either impaired or destroyed by many diseases.

The likeness of the scarf-skin to horn (for the nails, as has been said, are but a modification of the scarf-skin) is well exemplified both in its chemical constitution and consistency. Horn contains a good deal of sulphur, and burning nails emit a very suggestive odor of that substance. The longitudinal folds of the nail-bed correspond with the papillæ of the true

skin. As the nails grow in length, they increase also in thickness, by the addition of cells derived from the nail-bed.

The free borders of the nails require continual trimming with knife and scissors, and the thin layer of scarf-skin which is dragged forward by their growth upon the *lunula*, should, at the same time, be removed by pressing it back towards the roots of the nails; it should never be cut off. The surface of the nails should never be cleaned with anything harsher than the nail-brush.

It is scarcely necessary here to mention the desirability of constant care of the nails, in order to prevent the accumulation of foreign matters beneath their ends; "wearing them in mourning," as it has been appropriately called. Neglect in keeping them nicely trimmed, cleaned, and polished gives the hand the appearance of a most unsightly claw. Strange though it seems to us now, yet the Roman Emperor, known as Julian, the Apostate, actually rebuked the prevalent foppery of his day by his own evil practice of neglect in the particular just mentioned. Says Gibbon, the historian, "In a satirical performance, the emperor dwelt with pleasure, and even with pride, on the length of his nails and the inky blackness of his hands."

A habit which is utterly destructive of the beauty, and partially of the usefulness, of the nails, is that of biting them. The habit is most common among persons of a highly nervous temperament. These easily acquire the habit in moments of anxiety, perplexity, or distraction while reading. Bitten to the quick, with ragged shreds of skin surrounding them, as is usually the case, the nails, which, well shaped and cared for, crown the beauty of a well-shaped hand, make it wholly unpresentable. This habit, like all others, good or bad, is difficult to break, but it can be done under the influence of resolution supported by mortification from the knowledge of how all the refined world regards the practice. Comely young girls have been known to say that they could not stop it. Ah, if they had but been aware how it depreciated their value in the eyes of the opposite sex!

The healthy, rosy hue in the nails makes them beautiful. The reddish stain, however, with which the professional manicurist sometimes bedecks them, being a hue unnatural to them, gives an unpleasing effect to the cultivated eye. It reminds one of the prevalent custom throughout Asia, of staining the finger-nails and finger-tips with an orange-colored paste, called henna. The practice seems to have been common in the East from the remotest period known. Perfect nails, those inclining to filbert-shape, and to rosiness in hue, add greatly to the beauty of symmetrical hands, although they have been less discussed in poetry, romance, and daily life, than the feminine crown of glory in profuse hair. Among the Romans, the free edge of the nail became the criterion of smoothness. If it be pushed across any surface, such as that of a piece of sculpture, it detects the slightest roughness. Hence they spoke of a thing's being *ad unguem* (true to the nail) when it reached perfection.

CHAPTER III.

THE USEFULNESS OF THE SKIN AND OF THE HAIR.

THE uses of the skin are various. Some depend upon the skin as a whole, others upon the true skin, others upon the scarf-skin, while others, again, are referable to the fatty tissue below the skin. The use of the true skin, as being the most important of all, will be first considered here.

Just as the scarf-skin is exactly fitted upon the upper surface of the true skin, so the latter is closely associated with the parts beneath it, and adapts itself perfectly to their movements. The elastic and firm true skin, and the pad of fat upon which it rests, afford great protection against blows and falls. Their resistant power is well exemplified, for example, in the impunity with which the base-ball is caught. If imperfectly received, however, its impact may cause a dislocation or fracture of bones. This same protective property permits us to stand or to walk for hours, without harm to the sole of the foot. One of the most conclusive evidences of the fact of the elasticity of the skin is that bones are sometimes broken, or internal organs ruptured, by injuries that do not lacerate the skin. Dr. P. S. Conner, of Cincinnati, wrote, in an article upon gun-shot wounds, referring to the Crimean war: "Macleod, for example, reports that at the Alma, a round-shot, *en ricochet*, struck the scale from an officer's shoulder and merely grazed his head as it ascended. Death was instantaneous. The scalp was found to be almost uninjured, but so completely smashed was the skull, that its fragments rattled within the scalp as if loose in a bag."

The temperature of the body tends to be kept at the proper standard for health by the presence and action of the skin. Bodily heat is generated by the various chemical and vital processes constantly going on in all parts of the frame. The skin, being a poor conductor of heat, may be likened to a screen

interposed between the interior of the body and the outer world. This screen keeps the heat formed within the body from being too rapidly dissipated. On the other hand, it tends to prevent external heat from raising the temperature of the body to a dangerous point. The natural temperature of the outside of the body is ninety-eight and a half degrees, Fahrenheit. The temperature of the blood and the inner organs somewhat exceeds this degree. The average heat of the blood is about one hundred degrees, Fahrenheit, subject to slight variations at different times and in different parts of the body.

The principal sources of animal heat are muscular and glandular activity. Heat is one of several modes of motion, convertible into other forms of motion. Therefore, when heat is converted into energy, it, for the time being, disappears as recognizable heat. As heat is lost, it is, of course, continuously reproduced. So admirable are the physical adaptations to conditions, that the temperature of man differs but slightly in the arctic and the torrid zones.

Let us examine the mechanism by which this wonderful balance tends to be maintained. It is evident that the blood contained in the capillary vessels of the skin is in much closer proximity to the atmosphere than is that which circulates in the large and deeper vessels. It follows, therefore, that, although the skin is an imperfect conductor of heat, a certain portion of it must be dissipated by weather conditions. When the temperature is high, approximating or exceeding that of the body, the skin becomes relaxed and its blood-vessels expanded. The presence of elastic and muscular tissue renders it easily capable of expansion and contraction, and the elastic character of the blood-vessels renders them capable of change in caliber. If the atmosphere be lower in temperature than that of the blood, some of the body's heat is dissipated by radiation, precisely as is that of any inanimate object placed in the open air. But, if the heat of the atmosphere be above that of the body, it is manifest that it will gain in heat instead of losing it. When the

activities of the body are so disarranged that heat in it is produced more rapidly than radiated, illness ensues. A permanent increase of ten degrees Fahrenheit in the temperature of the body is incompatible with continued life.

What, then, is the method by which the body is maintained at what we call its normal temperature? It is by the conversion of heat into energy as manifested in work, and the special work by which heat is extracted from the body lies in the production and evaporation of perspiration. The office belongs to the sudoriparous or sweat-glands, and they, like all other glands, tend to be in constant activity. Perspiration is either sensible or insensible. At all times, even in the pleasantest and most equable temperature, the body is giving off heat by means of insensible perspiration. Under the opposite condition, it pours from the sweat-glands profusely. As heat is used in evaporating perspiration in either form, it is converted into what is termed "latent heat," that is, heat engaged in the performance of work, and whilst thus engaged is not perceptible in its own usually observed quality.

The air always contains some watery vapor. The higher the temperature, the more watery vapor is the air able to absorb. With every increase of twenty-seven degrees, Fahrenheit, above the freezing point of water, the capacity of the air to receive a watery vapor is doubled. When there is much moisture in the air at a high temperature, the sense of discomfort greatly exceeds that experienced at the same temperature when the air is comparatively dry. This is because the evaporation of perspiration is then slow, and its cooling effect thus lessened. When, on the contrary, the temperature of the air is low, but it is at the same time laden with as much watery vapor as it will hold, the heat of the body is rapidly radiated, as everyone must have noticed by fingers tingling with cold at a temperature by no means so low as when the atmosphere has been cold, but relatively dry.

This provision of nature for the body's regulation of heat

enables man to endure hot climates as well as cold ones. It permits workmen to endure, for long periods, an exceedingly hot atmosphere in machine-shops and on steamships. Dry air has been borne for from eight to ten minutes at a temperature ranging from two hundred to two hundred and seventy, Fahrenheit. The amount of perspiration poured out under these circumstances has been known to amount to from one to four pounds in an hour. A case is on record of a girl who remained for several minutes, without any ill effect, in an oven where the temperature was three hundred and twenty-five, Fahrenheit. Men have become used to entering furnaces for drying moulds, where the thermometer ranged from three hundred and twenty-five to four hundred, Fahrenheit. A person who called himself the "fire-king" was once in the practice of exposing himself for a short time to a temperature of from four hundred to six hundred, Fahrenheit. But in all these cases the air was dry, and the amount of perspiration so enormous as to render the exposure possible.

The depressing effect of moist heat is strikingly shown in the description, given by a French physician, of life in Tonquin. He says "drowsiness is unintermitting. The skin is constantly covered with perspiration, and, spite of drowsiness, sound sleep can be obtained only after repeated cold baths." Our own officers of the navy can feelingly testify to their experience of heat when on the Samoan Islands station. Extreme heat produces a rapid, tumultuous, and irregular action of the heart. The respiration is proportionately quickened, the blood-vessels of the various organs are distended, and the secretions are either diminished or suppressed. Chemical changes in the principal solid tissues and in the blood take place, incompatible with prolonged life.

Let us now consider the effect of cold upon the higher animal life. Contact with a cold atmosphere causes the skin to shrink. Its muscular fibers react in response to lowering temperature. As the skin contracts, the blood is expressed from

it and driven to deeper parts of the body. Much less blood being present in the superficial vessels, much less heat exists in the skin. The glands of the skin are comparatively inactive. Little perspiration is produced, and that little immediately evaporated. Muscular exertion is stimulated, and the result of its exercise is an increase in the body's consumption of oxygen and excretion of carbonic acid gas, the effete matter of the system. Thus the body is heating itself. Arctic explorers experience temperatures of from fifty-five to seventy degrees, Fahrenheit, below zero. In the frigid regions, near the pole, the Eskimo manage to exist. Their exercise and fatty food generate heat. Their furs and close dwellings economize it.

Knowledge of the degree previously mentioned as the healthy or normal degree of heat for the human body is obtained by placing the bulb of a specially constructed thermometer in the mouth. The heat of the interior of the body is thus obtained. As, however, the skin, even when clothed, is somewhat in contact with the atmosphere, it must part with some of its special heat. Different regions of the skin have, in fact, different temperatures. The touch of the hand informs us that the usual temperature of the skin of the forehead is higher than that of the skin of the feet. The temperature of those parts of the body usually clothed is slightly higher than that of the parts usually exposed. The face is generally half a degree warmer than the covered parts of the body. The temperature over great blood-vessels and over bulky muscular masses is greater than over different formations of the body.

The perspiration serves another useful purpose besides that of removing heat from the body and cooling it by evaporation. It is one of the means by which harmful agents are removed from the system. The manifold processes of life cannot proceed without constant destruction of effete matter, as well as of generation of new. The activity of the various organs brings about constant change in their tissue. As the result of this change, chemical substances pass into the blood which are really

waste products, from which the system must be cleansed. They are often, in fact, of a distinctively poisonous character. Some of them are removed by the perspiration.

The story has often been told of the young girl who, in one of the triumphal processions of the French Revolution, was gilded to represent some mythical figure. Thus exposed for hours, coated with an impermeable skin, perspiration was suppressed and death ensued. Death follows, in from six to twelve hours, the application of varnish to the skin of one of the lower animals. Extensive burns on the skin are fatal because, exclusive of the pain and nervous shock produced by them, the excretory function of the skin where they lie has ceased. When burns involve more than one-third of the general surface of the body, the death of the patient is inevitable.

In certain morbid conditions of the body, perspiration is immensely increased, diminished, suppressed, or variously altered in composition. In some cases, it is freely produced on one side of the body, while the other remains perfectly dry. A strange phenomenon, in some cases, presents itself in the alteration of the color of perspiration. It may be changed to green, blue, red, brown, or black. Some of these changes are caused by its absorption of substances previously absorbed by the blood from the intestinal canal. The color of red perspiration is owing to the presence in it of a certain microbe. Some diseases of the nervous system are occasionally associated with the escape, through the sweat-glands, of a liquid containing blood.

The natural lubricant of the skin is called *sebum*, matter of an oily character, secreted and excreted by the *sebum* glands; that is, formed there and expelled thence. It renders the skin soft and pliable. It also acts protectively to the skin in extremes of heat and cold. It is particularly abundant upon those parts which are exposed to great fluctuations of temperature, the nose, the ears, the face generally. As a lubricant, it serves a useful purpose at the joints, preventing chafing. It communicates gloss and pliability to hair, and aids its growth and preservation.

The skin has hitherto been considered as an organ that produces and gives out matter. But it is also capable of absorbing matter. The matters which chiefly enter the skin are water, vapor of water, and oxygen gas. The proof that even water can enter the skin is constituted by gain in the human body's weight, and relief from thirst, after immersion in water, or even after exposure to the vapor of water. Dr. James Currie, an eminent English physician of the latter part of the last century, relates the case of a patient who was unable to swallow either solid or liquid food, and who was kept alive by nutritive injections and immersion in milk and water baths. Oleaginous substances have the power of penetrating the skin, and physicians are daily in the practice of making use of them in the case of infants and little children whose nutrition is imperfect. It has been found that cod-liver oil, rubbed into places where the skin is thinnest, is readily absorbed by the blood-vessels, and its administration through the stomach avoided. Ointments containing medicinal substances are similarly employed by physicians of the present day.

Respiration, although, of course, to a very limited degree, takes place through the skin. The essential characteristic of breathing is the absorption of oxygen and the elimination of carbonic acid gas. This, as the main process, does not take place through the skin, but through the lungs. The capacity, however, which the skin possesses in the same direction, in a limited degree, is useful on occasions of unusual physical exertion. Horse-dealers know that when the skin of a horse has a rosy hue, the animal is likely to have both speed and bottom. This is because the capillary circulation is active and the action of the lungs is assisted by that of the skin.

The skin is of inestimable importance as the organ of sensation by which we become acquainted with some of the physical properties of the external world. It performs this office, of course, by means of its terminal nerves. Nerves are broadly divided for our conception of them into nerves of sensation and

nerves of motion. The former terminate in surfaces which may receive the impression of pain, of temperature, or of mere resistance. These nerves are distributed to all the tissues. Even the most insensitive tissues are susceptible to pain. The nerves, however, that are distinguished as motor nerves, penetrate the muscles for the purpose of exciting them to action. If a motor nerve distributed to a certain muscle be divided, that muscle cannot contract, that is, act, for it is paralyzed. Similarly, if a nerve of sensation that supplies a certain tract of skin be divided, loss of sensibility results.

Motor nerves descend from the brain through the front part of the spinal cord. Sensory nerves ascend to the brain through the posterior portion of the spinal cord. The province of the sensory nerves is to report sensations to the brain. The skin is necessarily the tissue in which the sensory nerves are most abundant. They begin in peculiar bulbous expansions situated in papillæ. It is in expansion of nerve-fibers that impressions are received from the outer world. The impression is transmitted along the trunk of the corresponding nerve to the brain, where it becomes a specialized perception.

The sensibility of the skin varies in quality. The most important variety of it is tactile sensibility, the special sense of touch in the hand. By the exercise of this we become acquainted with certain properties of matter, as hardness, softness, roughness, smoothness, extension, etc. The impressions from the sense of sight are by it modified. As in the case of other faculties, the sense of touch is capable of a high degree of development. The most conspicuous instance of the high development of tactile sensibility is among the blind. Professor Saunderson, who taught mathematics at Cambridge, during the early part of the eighteenth century, lost his sight from small-pox when he was about a year old. He, however, received a good classical and mathematical education, and manifested a special liking for the study of mathematics. His sense of touch was extremely delicate. He could perfectly distinguish not only

ordinary money, but could recognize Roman coins and medals, distinguishing spurious from genuine ones more easily than many persons could, endowed with sight. Dr. Carpenter, the physiologist, mentions the case of a blind friend of his who had acquired comprehensive knowledge of conchology, both fossil and recent, and who was able not only to recognize numerous specimens from his own cabinet, but to discover the closest alliances of a shell, previously unknown to him, after having thoroughly examined it by touch.

The blind are able to familiarize themselves with the faces of strangers by passing their fingers over the unknown features. So precise is the knowledge thus acquired, and so tenacious their retention of it, that they can recognize persons whom they have not met for a long time. The celebrated Laura Bridgman lost sight and hearing when she was but three years of age, and was also deficient in the senses of taste and smell. She was, however, gifted with a fine mind. Her education, undertaken by Dr. Howe, necessarily depended entirely upon her sensitiveness in touch and to being touched. She learned to recognize persons by touching them, and could remember them for an indefinite time afterwards. She was sometimes able to detect the relationship of sisters in the same manner. A Dr. Kitto relates the case of an Italian who lost his sight when twenty years of age. He had previously manifested no taste for sculpture, and for ten years after the beginning of his affliction remained entirely ignorant of that art. At the end of that period, however, he having, in the meantime, educated his tactile sensibility, began to take an interest in statuary. He then began to reproduce in clay models from works of art which he had carefully studied by feeling. Soon thereafter, becoming expert in knowledge of form, he learned to reproduce his clay models in marble, and eventually was able to make statues from the living human subject.

The strangest circumstance in connection with the condition of the blind is that they are sometimes able to distinguish

the color of surfaces. At the first blush, this seems, to the unscientific, incredible. But it is not, when one comes to know that the color of an object depends upon the reflection to the eye of a predominant ray of the prismatic colors. Surfaces must be (we know that they are, for, otherwise, they would all be of the same tint) differently affected by this selective characteristic of light. Therefore, the exquisite sensitiveness of touch among some of the blind is able to detect the peculiarity of surface which is associated with a certain color, and no other. It stands to reason, however, that such surfaces must always be smooth. An interesting example of this ability among a select number of the blind is given by Dr. Kitto. He says, in his work on "The Lost Senses." "A family tailor, in the Scotch Highlands, was blind during the last fifteen years of his life. Nevertheless, he continued to work at his trade, and could execute his tasks as well as, though less rapidly than, before his loss of sight. Garments of tartan plaid are difficult to make, even by those who have the use of their eyes, because every stripe and color must fit exactly at the seams. The blind tailor succeeded in doing this work perfectly well, and he seemed to acquire the capacity of recognizing colors by the touch."

Even among those persons who have the advantage of sight, proficiency in certain manual occupations communicates a wonderful degree of delicacy of touch. "The female silk-throwers of Bengal," to quote again from Dr. Carpenter, "are said to be able to distinguish by the touch alone, twenty degrees of fineness in the uncovered cocoons, which are sorted accordingly; and the Indian muslin-weaver contrives, by the delicacy of his touch, to make the finest fabric in a loom of such simple construction that European fingers could at best propose to make a piece of canvas at it." Another excellent illustration of cultivated delicacy of touch is presented by the wonderful facility with which the women employed in the U. S. Treasury Department recognize counterfeit coin or bank-notes.

Perversions of the sense of touch and insensibility in its

organs are often witnessed in unhealthy conditions of the nervous system. In hysterical attacks, the sufferers sometimes seem entirely to lose the perception of contact. They have also been seen to experience injury without giving any sign of consciousness of the fact.

A special modification of sensibility is the ability to distinguish various degrees of heat. It is probable that this office is served by nerve-fibrils different from those that serve the sense of touch, for, in certain cases of paralysis of the limbs, the perception of touch is abolished, and yet the surfaces involved are sensitive to temperature.

The appreciation by the skin of different degrees of temperature varies in different individuals. It also somewhat varies in different portions of the body among the same individuals. The left hand is more sensitive than the right in the matter of sensitiveness to temperature, whereas, the reverse is the case as regards touch. The fingers, the elbow, and the face are capable of recognizing very slight differences of temperature.

It is an interesting fact that cold substances seem to be heavier than those of equal weight at a higher temperature. Beyond a certain degree, heat is converted into a sense of pain experienced by the body. The pain is of the same kind, whether produced by extreme heat, extreme cold, or by pressure. The sensation produced by touching frozen mercury is not to be distinguished from touching red-hot iron.

The sensibility of the skin to temperature, as well as to other impressions, is modified by the condition of the central nervous system. Fear produces a sensation of cold, and may also produce an actual reduction of temperature through its influence on the nerves that control the blood-vessels of the skin. Dr. Erasmus Darwin, the grandfather of Charles Darwin, tells of a case of a young farmer, who, lying out all night, to detect a thief, was so appalled by the cursing of an old woman, who turned out to be the culprit, that he suffered with cold for many hours afterwards. The man's nervous system was, in fact,

so shocked from the outdoor exposure and experience with the old woman, that he took to his bed within a fortnight and kept it until his death, twenty years later.

Exaggeration of normal sensibility constitutes pain. Pain differs in character and degree according to many circumstances. It is produced, as already noted, by the application of extreme heat or cold, by severe pressure, and by wounds and disease. There is, however, great difference among individuals in regard to susceptibility to injury. Some persons can bear, without wincing, injury which to others is almost intolerable. The extreme sensibility of the first constitutes a real difference. It does not always depend upon the courage and fortitude of the individual, although sometimes it does. Every hospital physician knows of the relative composure with which the humbler class of patients bear pain. A workingman of rude health, of iron nerves, appears to suffer, and, doubtless, does suffer, less than educated men who have followed some sedentary occupation. On the other hand, it is a matter of everyday experience that, as a general rule, nervous, highly organized women bear pain more patiently than any men. This may, in a measure, depend upon the fact, that, excluding pain from accident, women are, more than men, habituated to bearing it. A celebrated Italian physician has come to the conclusion that women are less sensitive to injury than men are.

Difference in susceptibility to pain is observable among different races of men. Some are, under its infliction, comparatively stolid; others are extremely agitated. It has been stated that the Chinese can composedly bear wounds that would cause expression of great suffering among Europeans. They can sit or lie for hours without any sign of discomfort; but much of this ability is, no doubt, owing to habit.

The action of the mind largely controls recognition of injury. In the heat of battle or other conflict, serious wounds are sometimes not perceived; whereas, when injury occurs in cold blood, pain is immediately suffered. The Spartans of old

were trained from childhood to bear ills, including pain, unflinchingly, whence comes the expression "Spartan fortitude." The same trait is characteristic of the North American Indians. With them, it is a matter of pride to undergo torture without manifesting any emotion. Francis Parkman, the historian of French Canada, uses the following language in describing the Indian: "Over all emotion he throws the veil of an iron self-control, originating in a peculiar form of pride, and fostered by vigorous discipline from childhood upward. He is trained to conceal passion, and not to subdue it. In the torturing fires of his enemy, the haughty sufferer maintains to the last his look of grim defiance." And yet, we have been informed, those very same people, when confined to reservations, so change that they clamor for ether whenever it becomes necessary for the post-surgeon to perform the slightest operation upon them.

In certain mental states there is apparently entire abolition of a sense of pain. In well-marked hysterical cases, needles can be thrust into the skin without producing the slightest evidence of suffering. In the great hysterical epidemics which history records, there were marvelous instances of indifference to injuries, often self-inflicted. On the other hand, sensitiveness, associated with certain diseases, is enormously increased, so that the slightest contact is agonizing.

Alteration in the sensitiveness of the skin is not uncommon among the insane. Dr. D. Hack Tuke, in a life devoted to the study of mental diseases, cites many examples of this condition among the insane. He mentions, in his book on the subject of insanity, the investigation of a French physician who had stated that, in an institution containing six hundred melancholy idiots, he found that more than half of them presented different degrees of cutaneous sensitiveness. Most of those afflicted with melancholia, especially those whose disease was of religious origin, and manifested a suicidal tendency, were said to be remarkably insensitive to injury. Cupping-glasses and other irritants could be applied to their skins without exciting the least complaint.

The history of religion, not only of Christianity, but also of pagan forms of belief, affords numerous illustrations of the effect of religious ecstasy in producing insensibility to discomfort and injury. In the first half of the fifth century of the Christian era, St. Simeon Stylites passed thirty-seven years of his life upon the top of a tall pillar, or tower, engaged in devotional exercises, and apparently indifferent to weather. In the Middle Ages, nervous epidemics spread through many countries. Persons under the influence of the frenzy indulged in the most extravagant contortions until they fell flat upon the ground from sheer exhaustion.

On the contrary, the influence of mind may give rise to the sensation of pain when there has been no injury. Professor Bennett has related a case of a butcher, who, trying to hook up a heavy piece of meat, slipped, was suspended by the arm, and when rescued, declared that he suffered agony. But the hook had penetrated only his coat. A French writer, Gratiolet, tells of a law student who, when for the first time in his life he witnessed a slight surgical operation, was so deeply affected by the sight, that he felt at the same time an acute pain in his ear, sympathetically engendered by his having seen the small tumor that was removed from the ear of the patient.

Slight itching is occasionally experienced by everyone, and generally has no particular significance. When, however, it is severe, and more or less constant, an unhealthy condition is indicated, either of the blood or of the nervous system, or is caused by the presence of some disease of the skin. Whatever originates it, the immediate cause of itching is the irritation of the ends of cutaneous nerves. Its most violent phase sometimes attends certain functional derangements of the nervous system, while not a symptom can be seen in the skin itself, unless injured by scratching. In some inflammatory diseases of the skin, itching is an almost intolerable symptom.

Electric currents are generated in the tissues of the body. Where there is life, there is chemical action: the development

of heat and also of electricity. The electrical condition of the skin is generally opposite in sign, plus or minus, to that of most of the internal organs. Some persons are so charged with electricity that sparks are generated from their persons simply by removing clothing that has been worn next the skin. In some others the manifestation may be produced by rubbing the skin lightly and quickly with a linen cloth. An Italian physician relates the case of a lady from whose limbs "sparks of fire flew out plentifully as often as they were lightly rubbed with linen." Physical experiments have proved that slight causes, such as a shout, determine the production of electric currents in the skin. The state of the mind has also been found to exercise a decided influence upon the development of such currents. A tranquil state is not associated with their action in great degree, but a mental effort, as for instance, the attempt to solve a difficult problem, creates a current strong in proportion to the difficulty of the task.

The human skin, however healthy and clean, exhales an odor, which, if not always perceptible to fellow-beings, nevertheless exists. The fact is demonstrated by the well-known capacity of dogs to follow their masters when not in sight. No reference is here included to the unpleasant scents due to neglect of personal cleanliness. The purest bodies will sometimes emit a perfume so delicate that it has been likened to the odor of violets. Ability to recognize individuals by their odor has been observed. Instances are known where the sense of smell was so acute that, by it alone, difference between the sexes and between youth and age was detected. The case of a Scotch boy has often been cited, whose whole knowledge of the external world was derived solely from his abnormally developed senses of touch and smell.

Light has been observed to emanate from a living human body. The generation of light by organisms low in the scale of nature is a familiar phenomenon. It is seen in the phosphorescent animacules of the sea, the glow-worm, the fire-fly.

Luminous exhalations in grave-yards have given rise to much superstitious fear. In some cases of lingering, exhausting disease, phosphorescent illumination of the body has presented a very extraordinary spectacle. There is a well-authenticated case of a man who had been in a decline for years. As death drew near, visiting neighbors were awestruck at the light proceeding from his body. A celebrated Irish physician describes a cancerous ulcer whose light was perceptible by night, so vivid and steady that it could be seen at the distance of twenty feet.

Having now sufficiently considered the action and the usefulness of the skin, let us proceed to the attributes of the hair, but not in its æsthetic aspect, simply in that of its action and usefulness.

Excluding then, for the present, the consideration of the hair as an ornamental appendage, let us confine ourselves to discussing its usefulness as a protection. In the first place, sharing with the skin, of which it has been here demonstrated that it is derived, the properties of the skin itself, the hair is a poor conductor of heat. It follows that hair protects the parts which it covers from the effects of both heat and cold. It would be much better for the health, not only of the scalp, but of the body at large, if the wearing of head coverings were less common than now. In mild climates, during the warmer portion of the year, the hair was once, undoubtedly, the only covering used for the head. The use of headgear, even at the present day, is unknown among many wild tribes of mankind. Certain tribes of Arabs make use of no turbans, relying entirely upon their abundant growth of hair for protection against the sun. The same practice prevails among many tribes of Africans.

The hair contributes to the protection of the head in both hot and cold weather. In hot weather, it so contributes through its non-conducting property, by shielding the head from excessive outer heat, and in cold weather, from excessive loss of heat, by its radiation from the scalp. On account of women's profuse covering of hair of the head, they are less liable than men are

to cold from being bareheaded. The efficiency of this, nature's headdress, is clearly shown by this relative immunity from exposure.

The beard is an excellent protection for the throat, and is generally worn by the natives of, and travelers in, cold climates. Not infrequently it happens, that men subject to sore throat are cured by allowing the beard to grow. Walter Savage Landor, the distinguished writer, was, in this way, relieved of susceptibility to sore throat. Not only does the beard protect its wearer from cold, but it also protects him from the inhalation of dust, which is in many trades a very important consideration. Gritty particles are by the beard intercepted and thus prevented from reaching the lungs, in which their presence excites a peculiar form of disease. The beards of blacksmiths may be seen to be discolored by the accumulation of iron rust. Travelers in Syria and Egypt find it of great advantage to wear full beards as protection against the heated sands of deserts.

The remarkable elasticity of the hair affords considerable protection to the head from blows. Instances are on record in which this quality of the hair undoubtedly modified their force. Again, the hair protects the scalp from the bites of insects, no mean office for the inhabitants of hot countries swarming with poisonous insects. The hairs of the eyebrows and eyelashes protect the eyes from insects and fine particles of many sorts. The fine hairs at the entrance of the nostrils and the ears accomplish the same purpose. In addition, the growth of the hair is not without a certain influence upon the constitution of the blood. It is influential to some degree in the nutrition of highly organized tissues. Blood is a fluid of wonderfully complex constitution. It contains the elements with which every part of the body is nourished. Every part of the body has its selective action, through which it assimilates only just what it needs from this vital fluid. Equilibrium must be maintained, in order that every tissue and organ may possess neither more nor less than what is requisite for its proper sustenance. If this balance be

disarranged, the proper nutrition of some part or parts suffers. All parts are indissolubly joined together. The hair, which eliminates lime, sulphur, manganese, and iron from the blood, must play its own, if comparatively unimportant, part in the human economy, by influencing the maintenance of the normal standard of the blood. The nails, too, exercise in this direction a similar influence to that of the hair, but so slight, owing to the smallness of their surface as a whole, that their influence in this respect may be regarded as quite negligible.

CHAPTER IV.

THE COMPLEXION.

COMPLEXION depends upon a number of conditions; upon the general health, the quality of the blood, the quality of the true skin and of the scarf-skin, the disposition of the capillaries and their corresponding nerves.

The skin, like every other structure of the body, differs with regard to the delicacy of texture in different individuals. This natural covering of the body is also organized of variable thicknesses in the same individual, to meet corresponding needs. Although, however, this individuality obtains, there is also, as indicated, special difference among individuals. These remarks apply to the true skin, but the same are applicable to the scarf-skin, especially to its outermost, or horny layer. The glandular system of the skin has much to do with a good complexion. Excessive amounts of perspiration or of sebaceous matter render the surface of the skin unduly moist and oily. On the contrary, an insufficient supply of these renders it dry and harsh to the touch.

The principal conditions, however, of a good complexion, relate to the blood and nervous system. Coarseness of skin is not perceived as a decided blemish if both blood and nerves are in a healthy condition. In the body, the different parts act and react upon one another intimately and incessantly; it is a great factory, elaborating matter and discharging its waste. There can be no healthy skin without healthy blood. If the blood be disordered, the nutrition of the nervous system suffers, nervous force is depressed, and digestion fails to proceed. Continued failure of digestion easily to assimilate food, results in impoverishment of the blood. There is wonderful sympathy between the condition of the digestive system and that of the

skin, a sympathy that will be clearly demonstrated in the course of the following pages.

The scarf-skin is a very thin membrane. By reason of this fact, and also by reason of the fact that its outermost layer is a horny structure, it is translucent. It therefore only partially conceals the quality of the true skin upon which it rests. The color, the ridges, and the furrows of the true skin are discernible through the scarf-skin. Reference is, of course, here being made to the scarf-skin of the white races of men. The word complexion is used in two senses. In one it expresses the difference of color observable between Europeans or descendants of Europeans on the one side, and Africans and Asiatics on the other. In the other sense, which is that to which it is here at this moment confined, the word relates to greater or less degree of purity in complexion among persons belonging to the white race.

The scarf-skin depends for color upon the pigment derived from the lowest layer of the four thin layers of which the scarf-skin is composed. This pigment has been called *melanin*, from the Greek word signifying black. This matter contains iron, and is supposed to be a derivative of the *hæmatin* of the blood, which also contains iron. The abundance or the sparsity of *melanin* in the scarf-skin accounts for the widely different shades of skin found among different races, from the white race to the darkest. The color of the skin is one of the most conspicuous of the differences that characterize mankind. The terms Asian, Mongolian, Malay, Negro, and American Indian, have come down to us from the eighteenth century, and have become so familiar that they can hardly be discarded. Nevertheless, they imply a fallacious distinction. It is impossible to classify mankind precisely, either by color or the form of the skull. The evidence of language furnishes us with a more trustworthy criterion with relation to descent. We now know that tribes and peoples may be allied, though they may differ as to both color and the shape of the skull. Conversely, they may agree as to color and the shape

of the skull, and yet differ much in other attributes. For instance, there can be no doubt that pure Hindus belong to the same race as the Latin, Germanic, and Celtic peoples. Yet the Hindus have dark skins and are sometimes jet-black, while their hair is straight and their features as clear-cut as those of Europeans. Arabs seem to belong to an entirely different race from the Caucasian, and yet they are generally characterized at present by the same form of skull, features, and hair. The oldest settlers among the Arabs, in Africa, however, exhibit every gradation of color, from the swarthiness of Southern Europeans to the blackness of Africans. Mongolians generally have a yellowish tinge of complexion; Malays, a brown one; and the North American Indian, a reddish-brown one, generally called copper-colored.

The color of the scarf-skin is obviously influenced by climate. The descendants of Europeans long settled in hot countries acquire a swarthy complexion. When this tendency is transmitted through many generations, one can readily see that it is sufficient to account for the various shades of complexion observed in different countries. Life-long exposure to the sun browns the faces of seafaring men. If a person has been originally a light-complexioned man, associated with light hair and eyes, the change to a dark complexion contrasts oddly with those attributes. The rays of the sun make an increased deposit of coloring matter in the scarf-skin. Once formed, it is never entirely lost. This refers, of course, to constant exposure to the sun, not to that which belongs to an occasional outing. Even the influence of that, however, slight though it is, is never entirely lost. It has been of late a fad among some women to allow themselves to become somewhat sunburned, partly as evidence of having been in the country, and partly from the notion that by it an appearance of health is presented. But good circulation of the blood ensures a better sign of health than do the most delicately tanned cheeks. Men, women, and children need sunlight, just as much as do plants, but, in the interest of a

good complexion, direct and prolonged exposure of it to the sun's rays had better be avoided by women if they wish to preserve their good looks. The same remark holds good, of course, for the hands. A well-formed and white hand is certainly a beautiful object, decidedly marred by discoloration. Briefly, while the female sex should be encouraged to out-door enjoyment, it should not neglect one of its highest attributes of beauty in the complexion. In speaking generally of complexion, it is to that of the female sex to which reference is now made. If a man's face be free from profuse freckles and blotches, the world seems to care little if it be light or dark. Of course, there are types of masculine, as well as of feminine beauty, but departure from the former affects our æsthetic sense far less than does departure from the latter kind.

An abrasion of the skin shows the bright red color beneath it, of the surface thus exposed. This red surface is the true skin, from which the scarf-skin has been forcibly detached. This color of the true skin is owing to the large amount of blood that it contains. No blood-vessel enters the scarf-skin, which obtains its whole nutriment from this true skin, to which it is intimately attached. The soft, young cells of the lowest stratum of the scarf-skin imbibe the watery portion of the blood from the true skin for their sustenance. The true skin and the subcutaneous connective tissue upon which it rests are rich in blood-vessels. One of the functions of connective tissue, where found, is to support blood-vessels.

Arteries lying beneath the skin send upward numerous branches which penetrate the meshes of the skin. From these branches smaller vessels divide, and the process of subdivision is carried on indefinitely, until every portion of the true skin is supplied with its own little artery. An artery, however minute, is too thick-walled to supply nutriment directly to the cells of the tissue to which it is to be distributed. The wall of every artery is composed of three layers, or coats. The inner layer, that through which the blood flows, is an exceedingly thin,

smooth, delicate membrane. The middle layer is composed of muscular fiber. The outer layer is composed of fibrous tissue. The two outer layers give strength, elasticity, and contractile power to the artery.

As arteries become smaller and smaller as they approach the cells of the skin which they are destined to support with nutriment, their two outer layers grow thinner and thinner until they finally disappear. The vessels now consist of but a single layer, and in this condition they are called capillaries. The elements of the blood are capable of passing through their membrane, by which alone they are separated from the enclosing tissue. An artery becomes broken up into an immense number of capillaries. It has been calculated that the average number of the smaller blood-vessels is nearly four hundred times that of the trunks from which they depart. They are so minute, that the blood necessarily flows very slowly through them. The cells which their contents nourish are thus afforded plenty of time for the absorption of their nutriment. It is while the blood is thus relieved of a portion of its elements, that the change takes place from arterial to venous blood. But little need be added in this connection about veins, inasmuch as, before the blood reaches these vessels, nutrition of the tissue has already taken place. Veins, as well as arteries, have three coats, but in them the muscular layer is considerably thinner than the muscular layer of arteries is. They are entitled to distinct mention in connection with the complexion, on account of their delicate lines of blue, which everyone must have observed to enhance the beauty of the red and white tint of the skin.

The highest manifestations of life take place through the agency of the nervous system. The brain and the spinal cord preside over the manifold activities which are carried on within the body. Nerve-fibers go to every secreting gland and accompany every blood-vessel. Nervous matter consists of two kinds, gray and white. The white kind is arranged in the form of filaments. The function of this variety, commonly known as

nerves, is to conduct impressions to or from the brain. The gray kind of nervous matter forms collections of various sizes in various situations. Its function originates and modifies impressions. It consists of aggregations of cells; but although white nervous matter also consists of cells, they are arranged in filaments, whereas the gray matter is arranged in masses. Collections of gray matter are found upon the walls of blood-vessels, upon muscular masses, in the neighborhood of important glands, and in other situations. The nerve-filaments are connected with these collections of gray matter, and they in turn are connected with the spinal cord and the brain. The spinal cord is composed internally of gray matter and externally of white matter. The white matter of the spinal cord consists of innumerable white fibers on their way to or from the brain. Those bearing messages to the brain pass upward along the posterior portion of the cord. Those bearing mandates for action from the brain, descend along the anterior portion of the cord.

In the brain itself, these two kinds of nervous matter are disposed in the reverse manner, the gray substance being arranged upon the exterior, and the white substance in the interior. Within the brain there are, besides, other collections of gray matter. The white substance connects the different masses of gray matter with one another throughout the whole brain and body. It is through this arrangement by which a mechanism is formed which controls the whole organism. Masses of gray matter are called *ganglia*, from a Greek word meaning knots, because they bear some resemblance to knots. The gray matter within the spinal cord, and upon the outer surface of the brain, being expanded and continuous, has not the appearance of being knotted. Nevertheless, both brain and cord are properly regarded as containing a service of *ganglia* consolidated, for it is known that different areas are devoted to the performance of different functions. The human brain constitutes the highest development of the nervous system.

The nervous centers, both high and low, may be justly compared, in a functional way, to an army. Each subaltern commands a certain number of units, but his orders are taken from a superior officer. The privates come into immediate relations with the officers of their own company. The regiment is under command of a colonel, who, in his turn, is under command of a general, and he, under the command of a general-in-chief. The general-in-chief, although controlling everything, ordinarily comes into little immediate contact with the lower ranks of which companies, regiments, brigades, and corps are composed. We may, in some such fashion, regard the functional constitution of the brain. It has virtual dictatorship over all the nervous system, but every individual portion has its own specified duty.

There are two chains of *ganglia* stretched along the front of the spinal column, one upon each side. The branches sent off from these chains join nerve-fibers that emerge from the spinal cord, and, in certain places, form an intricate network called a nervous *plexus*. In the abdominal cavity there are several large plexuses, one of which is of so great size and importance, that it was denominated by Professor William H. Pancoast "the abdominal brain." From these plexuses proceed branches to all the great organs of the chest and abdomen. This system is collectively known as "the sympathetic nervous system;" so called because it serves those organs which may be sympathetically disturbed by derangements occurring in other organs, or brought about by affections of the mind. The nerves under discussion, which issue from the spinal cord, are called "cerebro-spinal nerves," *cerebrum* meaning brain. Each set of fibers of which the two sets are composed, exhibits individual peculiarities of structure, but they are closely connected by branches which pass between the two systems.

The reader is now scientifically prepared to understand the action of the nervous system upon the blood-vessels of the skin, and therefore as influencing the complexion. Upon the exterior of all blood-vessels, of whatever kind, and wherever situ-

ated, minute nerve-fibers run. Blood-vessels are not rigid tubes. They dilate and contract, and these actions are accomplished through the agency of the nervous system, called "the vasomotor system," *vas* meaning a vessel or vein. At certain points upon the wall of a vessel, small *ganglia* are situated. The office of the vasomotor nerves is to contract and dilate the blood-vessels. Irritation, followed by activity of the supreme nervous centers, is followed by change in the caliber of the blood-vessels.

The importance of the vasomotor nerves is immense. The varying caliber of the blood-vessels is intimately associated with nutrition of the tissues. In the skin, it is apparent in its fluctuations of color. The higher vasomotor centers are peculiarly susceptible to emotional influences. It may be shown in the blush that mantles the cheek from modesty, confusion, or shame. When the mind is swayed by powerful emotions, alternate flushing and paleness may occur. Fear, as already elsewhere mentioned, causes blanching of the skin. Under powerful emotion, evidenced by these signs, the circulation of blood through the brain may become so enfeebled that the person affected may faint. The effects of emotion upon the skin are usually transitory, but there are cases where anger or fear or other strong emotion has given rise to jaundice which discolored the skin for some time.

What has been heretofore said regarding the complexion is easily summarized. A smooth, clear skin, and a healthy color, are its prime constituents. The color depends upon the amount of pigment contained in the scarf-skin and upon the quantity and quality of the blood circulating in the capillaries of the true skin. In a state of health, the arteries are not visible in the skin. The large veins that course beneath the skin are visible as blue lines, their color being due to refraction and reflection of the rays of light. It is the horny layer of the scarf-skin that produces its exquisitely smooth surface. The general tint of the complexion, whether fair or dark, is of minor importance to beauty, provided that the hue of health be not absent.

It is not indispensable that the color should be habitually high. A translucent skin, in which color readily comes and goes, in response to emotional bidding, is preferable to one in which the tint never varies. A pure, white skin, upon which a rosy tinge is seldom seen, may, however, be very beautiful. If the eyes be bright and lips vermillion, we may be sure that paleness in a face is not indicative of ill health. Poverty of red corpuscles in the blood, two of whose elements are red and white corpuscles, is incompatible with proper nourishment, incompatible with all outward attributes of health and beauty.

CHAPTER V.

THE ELEMENTS OF BEAUTY AND GRACE.

ESTIMATE of the relativity of beauty varies among different races of mankind, in accordance, to a large degree, with their own prepossessions acquired in early life. We find, even among artists, whose training makes them, of all persons, the least prejudiced in views of beauty, a universal tendency to regard as the highest types of human and of inanimate beauty, those to which they have been accustomed from birth. It is the same with artist views as to all forms of beauty; the inspiration to carry them into being through action proceeds along lines of both racial and natal development. We see this conspicuously in the architecture of different races.

Savage tribes, unlettered, uneducated in the higher sense of the word, are unable to give expression to anything that is deemed beautiful by the civilized peoples of the world. As they are without architecture, painting, and sculpture, or the rudest success in those arts, we are justified in thinking that they are even destitute of a sense of the beautiful in those departments of human conception which would lead to execution in art, and that they are, therefore, probably even destitute of sentiment for those works when produced by others. When we come to consider the ideas of these people regarding personal beauty and adornment, we find them not only crude in both particulars, but often positively offensive to the taste of more highly organized races. Let us consider briefly cases of these conditions, by way of showing the depth of æsthetic degradation in which some peoples of the earth still live. In some places in Africa, the most beautiful female form is considered that in which the posterior is monstrously developed. There are tribes that insert, in holes bored in their noses, pieces of stick, pebbles, or rings. The ears are sometimes so treated as to be drawn down in great flaps.

Among the Guaranis, of South America, it is customary to slit the upper lip, in order to expose the front teeth. The African Kaffirs train their lips to project like snouts. Sir Samuel Baker, the great African traveler, informs us that some native idea of facial beauty is the visage of the dog-faced baboon. It has been reported that the Dyaks, of Borneo, think beautiful the nose of the monkey. The Tasmanians consider a tattooed skin as not only elegantly adorned, but a requirement of decency. The Flathead Indians, of Northwest America, force the bones of the skull from infancy into a distorted growth. There are peoples who blacken their teeth. According to an article written by Dr. Magitot, of Paris, it is customary in Japan, China, and the Indo-Chinese Peninsula, for a girl, upon the occasion of her marriage, to administer to her teeth a black varnish. He also tells us, that among various African tribes the central upper teeth are extracted. In the Malayan archipelago, filing of the teeth prevails.

We know what were the ideas of beauty entertained by former civilized peoples, from the study of their sculptures and architecture. Distinct racial conceptions of beauty are recognizable, as Chinese, Assyrian, Egyptian, Greek, and Saracenic, upon each of which is stamped impress of the special point of view as to beauty. The partially buried ruins amid the forests of Central America, and what remains of Aztec and Peruvian civilization, point in the same direction. From historical knowledge, locality, and remains of objects of art, modern art has been most profoundly affected by that of Greece. In the best Greek sculptures, modern artists find superb representations of beauty of face and form. They prove to us, not only the high degree of artistic genius and talent among the Greeks, necessary for their execution, but also that the living models from which these ideals were formed must have been of exquisite beauty of their highly developed race.

Estimation of beauty differs even among individuals of the same race, as well as among races themselves, although not to the same degree, as ought to be recognized from what has

already been said. To persons of artistic sensibility, the contemplation of human beauty, or of beauty in landscape and ocean-shore, affords the most exquisite pleasure. The uncultivated, rude minds of persons living even among those of the highest civilization are wholly inappreciative of the beautiful in any form. The glory of sunset, the landscape adorned with hills, woods, and streams, the field of grain, the purple mountains with snow-capped tops, the grazing flocks and herds, excite, if any, only feeble perception of the beautiful. The poet or the artist, on the other hand, roams through hills and valleys, and there finds in every shining cloud, every shadow, every rippling stream, in the very herbage beneath his feet, the flowers by the wayside, unending sources of gratification. The boor often moves among the same scenes and scarcely looks to find anything to admire. To him

“A primrose by the river’s brim
A yellow primrose is to him,
And nothing more.”

It follows that, upon the basis of race as the fundamental condition, education, in its highest sense, is indispensable to the perception and enjoyment of beauty. Of all human beings, poets and artists are those who are most keenly alive to its manifestations. The critical faculty is common to a much larger number of mankind. To be able, however, not only to perceive, but to express the sense of the beautiful must be regarded as proof of deeper understanding of it. Much fruitless discussion has taken place as to whether beauty belongs to objects in themselves, or lies wholly in the mind of the beholder. But, as we have already seen, beauty must exist independently; and just as a purblind person sees objects only indistinctly, so one of æsthetic mind has vision of the beautiful in proportion to his mental and artistic capacity and culture, some persons being to it purblind, and others living perceivingly in its fullest radiance.

Female loveliness has ever been the favorite subject of the poetic, plastic, and pictorial arts. It dominates the world of fiction and romance. Who can compute the value in influence for good that follows the appeal of beauty allied with goodness in a heroine; who underrate the lessons taught where beauty is, on the contrary, allied with base passions? The whole civilized world is in accord in thinking that feminine beauty allied with nobility of soul is the highest type of creation. Without virtue, however, it shrinks, even in the estimation of the crowd, to the level of the pedestal upon which it might stand peerless.

In the study of anatomy, we begin with the bones of the human frame; first considered separately, and then as articulated in the skeleton. To the bones the muscles are attached.

It ought to be evident that beauty of head and face largely depends upon the contour of their bones. A head gently curved from side to side, and lengthwise, constitutes the basis of other pleasing symmetry. The forehead, whether high or low, should deviate but little from the perpendicular. Beauty of face depends most largely upon the size and shape of the nose. The substructure of the nose consists of bone and cartilage. Two thin, flat bones are connected with each other in the middle line of the nose; and above with the bone of the forehead. The apertures of the nostrils are surrounded by flexible cartilages, which become continuous with a similar plate dividing the cavity of the nose into two corresponding halves. A nose out of proportion to the size of the face seriously mars the effect of the brightest eyes and best possible mouth, teeth, and complexion. Too small, it gives insignificance to the expression of the face; too large, it presents the grotesqueness of a mask. Two typical forms of nose are recognized as noble—the Greek and the Roman. The former leaves the forehead at only a slight angle, and continues straight to the tip; the latter boldly curves from the forehead to the tip. Between these two, which are never broad, lie an infinite variety of nasal forms in curve and breadth, from the comic snub-nose to that which the French call *retroussé*,

slightly curved inward and turned up, appropriate to the liveliness of the soubrette, but not to the highest elegance and nobility of the female face. Pug and snub noses always possess the comic element. A slightly tilted nose is, however, not displeasing, when otherwise well formed, and this is the typical *nez retroussé* of the French, the nose that Tennyson calls "tip-tilted."

A very common defect in the expression of the face is the bending of the tip of the nose towards one or the other side of the face. Obviously, a very important factor in the general expression of the face lies in the nose being neither too long nor too short. From its prominent position, it is, of all the features, the one most liable to injury, especially in the male sex, which, from fights of school-boy days, through more out-door experience than that of women, incurs more than they this liability, which, in women, is in much less degree chiefly reserved for accidents of various sorts in carriage, automobile, and car. Michael Angelo's nose was broken by a hammer in the hands of an irate fellow-student of art. Thackeray's nose was badly broken. During his visit to this country, one of his literary entertainers who was similarly afflicted once held forth on the subject of love, when Thackeray exclaimed, "Why should two broken-nosed old fellows like you and me talk about love?"

The eye must be esteemed the most striking and beautiful feature of the face. Placed, by internal relations, in close connection with the brain, it has been well called the mirror of the soul. The eye well seated in its socket, neither sunken nor unduly prominent, the lids well fringed with lashes, expresses every emotion, is capable of kindling or softening with every thought that passes through the mind. It is beautiful alike in the expression of meditation, mirth, pity, and love. It not infrequently anticipates or contradicts the spoken word, and has its own laugh, independent of the general expression of the face. Its sparkle illuminates the jest, its gaze expresses sternness or resolution, its gleam betokens anger, and may betray a disordered

intellect. In persons of lively temperament, it glances in quick response to the emotions. In persons of sluggish temperament, it is comparatively unresponsive. Persons of undaunted resolution are characterized by eyes which enforce obedience. They reveal immediately the habit of command. The numerous epithets that have been applied to this feature testify to the general recognition of variety in its expression—penetrating, hawk-like, eagle, sparkling, cunning, dove-like, and a host of others. A person possessed of fine eyes has at least one attribute of beauty. They may not be noted on all occasions, but, when animated, assert their value in expression.

The mouth certainly comes next to the eyes as an expressive feature. The lips should meet gently and evenly to form the angles which have been likened to Cupid's bow. Oliver Wendell Holmes says, that a gentleman should be calm-mouthed. It follows, of course, that a gentlewoman also should be. Nothing can be more distasteful in manners than a girl's mouthing in conversation so as to show her palate, or than her chewing gum in public. The natural color of the lips, when the general system of the body is perfect, is vermillion. Attempts to imitate this natural hue by artificial coloring are always discoverable by daylight. The upper lip should be short, and less full than the lower one. Both should be neither distinctly full nor thin; too much fullness gives an effect of grossness, and too little, of pinched meanness. The Bourbon lower lip, of Europe, has been transmitted for many generations in that family, and is recognized by its excess of fulness.

The teeth contribute essentially to the beauty of the mouth, and thereby to the expression of the whole face. Decayed teeth ruin the appearance of a face which might otherwise be very presentable. Although fine teeth are not in themselves sufficient to constitute beauty, they contribute largely to comeliness. A most unfortunate protrusion of the upper jaw may, however, neutralize the good effect of the handsomest teeth. Another unpleasant effect is sometimes produced by the recession of the

upper lip in smiling, to so great a degree that the gums are uncovered to their base. Of eighteen hundred and sixty-one school children lately examined in London, only one in eighteen was found to possess sound teeth. Sir James Crichton Browne has directed attention to the necessity of giving children harder food than that with which they are generally furnished in England. It is the law of nature, that the parts of the body which are habitually exercised become of greater size and strength; and that those which are but little exercised become diminished in size and efficiency. It is suggested that the soft food upon which we are so largely living in modern times has, by demanding less work of the teeth, checked their development, and that this condition tends to be transmitted by inheritance. It has been asserted that brown bread, on account of its containing bran, is of much more nutritive value for the teeth than white bread is. The enamel of the teeth contains fluorine, and this element is present in the outer envelope of grain. To preserve the teeth, they should be carefully brushed and have passed between them a silk thread. Thus, accumulation of tartar and incipient decay may be largely prevented.

Ears, important as they are in function, are usually of less beauty than other features, and are sometimes partially or wholly concealed by fashion in the headdress of women. At the same time, although the rarest of fine attributes, they are, when perfect, very beautiful. To be so, they must be small, sit close to the head, be finely curved on their outside edges and in their whorls, and end with a tiny drop. Nothing can be more vulgarizing to the appearance than a huge, long flap of flesh, with little modelling, ending with a great lobe or drop. The ideal ear, on the contrary, gives the most high-bred effect. In the New York Dusseldorf Gallery of painting there was once a picture where Desdemona sat near a casement, the light from which shone through her translucent ear, making it look like some delicate pink shell of the ocean.

Well-shaped features, of course, form the basis upon which personal beauty depends, but this advantage is either decreased or lost entirely if they are covered with an unhealthy skin. A good complexion is so charming an attribute, that it goes far to compensate for irregularity of features. Both blonde and brunette have their distinctive charms, and it is impossible to decide between them as to which is preferable on the score of beauty. Fair beauty is associated in the popular mind with gentleness and purity, and also, to some degree, with fickleness. Dark beauty is, on the contrary, associated in the popular mind with brilliancy and force, and with greater stability. There is a type known among hair-dressers as ash-blonde. The skin is fair, the color good, but not high, the hair and eyes light, having a certain tawny tint. In the various types of female beauty at their best, the observer may well find himself perplexed to decide which is supreme, and will conclude at last as to their competition, that a verdict is impossible. The color of the skin is generally associated with the color of the eyes and hair. There are exceptions, but they are rare. Preference is frequently directed by admiration of opposite traits. The Latin races show marked predilection for persons possessed of fair attributes in skin, hair, and eyes, far removed from their own corresponding darker traits.

The chin cannot be regarded as one of the principal elements in comeliness, and yet upon its size and outline depends a good deal in the matter of looks. A great, heavy, elongated chin and a short, meager one are, each in its way, unsightly. The chin-bone consists of two bones which have become consolidated in the middle. At each side of the face, about an inch below the lobe of the ear, can be felt the angle of the jaw. The line in the middle of the chin, at which the two halves of the jaw join, is called the *sympathesis*, from two Greek words which signify coalescence. The angles of the bones on each side, as they reach the *sympathesis*, form the contour of the face as seen from the front. In some persons, the lower border is almost

a straight line, producing a somewhat square outline, expressive of determination, but too harsh in expression for female contours. Sometimes the end of the chin has a decided protrusion, which is not amiss in a man, but is certainly not pleasing in a woman. On the contrary, the line of the chin may slope backward, which always gives an appearance of weakness of character. More rarely, the chin is peaked.

The expression of the face may atone for great irregularity of features. Expression is so far superior to regularity, that it may prevent us from perceiving the defect of irregularity. Traits of beauty are not, in some countries, more freely bestowed upon those whose ancestors have been long socially well placed than upon those who have but just made their way in the world. In the United States, owing to many causes, difference in personal attributes among different classes of society has become obliterated. The progeny of people of moderate circumstances and social position are as likely to be handsome and well formed as that of the richest and most highly placed.

A good figure, which is the fashionable name for form, having originated from the social idea of dress, depends primarily upon the symmetry of the skeleton, and secondarily upon the proper distribution upon it of muscular and fatty tissue. Strong muscles are needful for maintaining the spinal column and shoulders erect, thus giving a good carriage to the head. A weak condition of the muscles ensures round shoulders and awkwardness of movement, which together seriously detract from any graces of countenance.

The conformation of head and features may be correct, the hair luxuriant, and the complexion pure, yet a squint may mar the general effect of all these. When the defect is slight, it hardly deserves the name of deformity; it may, in fact, even lend to the face a piquant, not unpleasant expression. But when it is extreme, it is very disfiguring. To allow a child to grow up with so serious a blemish, easily corrected by surgical interference, is very reprehensible. To the skilled oculist, the removal of

this defect, which is known to him as *strabismus*, is attended with scarcely any danger, and with the employment of very little time.

Very ingenious operations have been devised in surgery for the improvement of deformed noses and ears. If it should prove, in any case, not possible by artificial means to remedy their defects entirely, the result is always satisfactory when comparing previous conditions of the organs with those succeeding the surgical interference.

The mouth is sometimes afflicted with a cleft known as hare-lip. The fissure is usually situated a little to one side or the other of the middle, a defect due to failure in the complete development of the upper lip. Sometimes a fissure is present on both sides of the lip, separated by a central piece of flesh, which varies in size, shape, and direction in different cases. In some cases a cleft is correspondingly present in the upper jawbone as well as in the lip. Fortunately, these complicated cases are rare. The single hare-lip is of not infrequent occurrence, and is more common in the male than in the female sex. Hare-lip occasions so much mortification to its possessor, it is almost incomprehensible that children should be allowed to become adults without having the defect removed. Simple cases can be relieved by an operation which ought to be performed during infancy. Eventually nothing is to be seen, in place of the yawning fissure, but a perpendicular scar. The puckered appearance, just after the operation, soon smooths away, and improvement in the appearance of the face is extraordinary. When the subject, if a boy, reaches manhood, he can grow a mustache, and all trace of the defect becomes imperceptible. Double hare-lip is nearly as amenable to treatment as is the case of single hare-lip. In that deformity, where the upper jawbone is implicated, the defect in the lip may be rectified in infancy, but that in the jawbone is better left untouched until the subject has attained the age of twelve or fourteen years. As soon as the child is old enough thoroughly to appreciate the usefulness of a metallic plate adapted to the place, it will, when inserted by a skillful

surgeon, effect a very marked improvement in the otherwise imperfectly articulated speech of the patient.

Deformity sometimes occurs in weakly schoolgirls from the habit of slouching over their desks. Not only do they thus become round-shouldered, but, being right-handed, the muscles of the right arm soon become unduly better developed and stronger than those of the left. The muscles which pass between the upper part of the right arm, shoulder, and spinal column overcome the opposition which the corresponding structures of the left side should exert, as a consequence of which the vertebral bones of the upper part of the back are gradually drawn towards the right side. This deviation is surgically known as lateral curvature of the spine. It is seen in various degrees, from an almost imperceptible deflection to a decidedly curved and humped shoulder, so manifest that it cannot escape the observation of the most careless observer.

The production of curved spine is promoted, if the bone and muscular system is below the normal standard of health. About two-thirds of bone consists of mineral matter in the form of various salts of lime, with a little magnesia. In the disease of rickets, these earthy salts are so notably diminished that the solidity and consequent firmness of the bones are sensibly impaired. It is a disease which indicates insufficient nutrition, not only of the bones, but of other parts of the body. The muscular system is correspondingly weakened, and for this reason, additional tendency is given to the production of lateral curvature of the spine. Weak bones and lax muscles together conspire to the same end. Poor blood, from poor quality of diet, lack of exercise in the open air, sitting with a stoop for hours daily, tight lacing, may eventually produce lateral curvature of the spine. Whatever interferes with the proper growth of muscles may be a source of the affection, and, on account of general difference of habits in exercise, girls are vastly more than boys subject to this disease.

When the disease exists to a moderate degree, it is evidenced chiefly by general debility. Symmetry of form is lost, and recourse is had to the art of the dressmaker to conceal the defect. This is the stage at which appropriate treatment should be instituted. The most efficient treatment consists in systematically training the weak muscles of one side to oppose more vigorously their stronger fellows of the other side. The physician can outline a course of calisthenics by which the form of the opposing muscles may tend to be equalized. In case a rickety condition be present, medicinal preparations containing lime are indicated, as well as tonics to improve the appetite and digestion of the patient. If allowed to proceed unchecked, the rotation of the spinal column to one side results in sad distortion to the figure. It likewise produces serious impairment of the general health and ultimately destroys beauty in facial expression. The malposition of the spinal cord affects its nutrition and its influence upon the heart, lungs, and digestive organs. The face becomes pale and assumes an anxious expression.

Well-developed muscles hold the body erect and render its movements easy. Muscular masses, admirable in the athlete, must, in the interest of beauty of form in the female sex, be concealed by fatty tissue. As a well-proportioned female form is largely dependent upon the amount of adipose tissue that it possesses, it is important for women to know how they can control the amount of that tissue in the interest of their looks. The activity of childhood generally prevents any undue accumulation of fat during that period. The materials capable of producing that tissue are then generally consumed in the production of energy. The sports of youth strengthen, enlarge, and solidify the muscular system. At the approach of womanhood, the bony protuberances and irregular muscular masses of the person are overlaid by a cushion of soft, elastic fat. To maintain shapeliness, the amount of this deposit must have nice relation to the size of the person. Superabundance of adipose tissue is more destructive of personal beauty than is any amount of leanness;

and, besides, the lean generally have the advantage over others of sprightliness of mind and activity of the body. The positively corpulent of either sex are often sluggish in mind, ungraceful and even clumsy in movement, and the features, surcharged with fat, heavy in expression.

Leanness is more compatible with health, even extreme leanness, than is fatness far short of corpulence. Leanness, however, should be carefully distinguished from emaciation, which is evidence of waste in both muscular and fatty tissue. There have been fashions in female beauty. In the early part of the nineteenth century the fragile beauty was in vogue, who fainted at an odor, who played, and sometimes it was only played, the part of a creature of sweet sensibility. That day is past, and we now have in her stead the woman of reasonable muscular development and vigor. It is from the standpoint of her needs that all is said herein written. Macaulay says, in one of his essays, that he once amused himself by counting how many times the heroine of a certain old-fashioned novel fainted. He might have gone farther, and have counted how many times she said "La, Mr. Jones!" when she was terribly shocked. But she is dead now, peace be to her ashes, if she was material enough to make any! The present one is of a very different type, affording, moreover, pleasant variety. So great is it now that it is reconcilable with Lord Houghton's lines:—

"And from beauty passed to beauty
Constant to a constant change."

Features, in themselves amenable to criticism, may be combined with unexceptional expression. In George Eliot's "Daniel Deronda" we have presented a description of a fascinating woman with long, narrow, green eyes, *retroussé* nose, and swaying neck, and withal, thin. Those who are decidedly thin naturally wish to gain flesh; those who are too stout, to lose it. Brillat Savarin says that to possess just the right amount of *embonpoint* is the thought of women's lives. It is not, however,

so difficult to attain this as many of them believe; but, alas, in the case of reducing fat, it requires some resolution and self-denial! If a woman who has too much adipose tissue will persist in inertness and addiction to certain kinds of food, her case is hopeless of remedy.

Habits of exercise, diet, and bathing may be so regulated as to reduce the amount of fatty tissue in the body, or, on the other hand, to increase it; although the former is by far the easier task, and may, indeed, be regarded as relatively quite simple. Strenuous activity of body and mind, and constant anxiety, prevent accumulation of fat. Therefore, those who wish to gain flesh should cultivate, as far as possible, serenity. In real trouble, this is, of course, impossible as to results, but there is a large margin in the occupation of human mentality which is pure waste in the form of worry. This unnecessary strain avoided, and due regard being had to proper food and sleep and exercise, all is done for the lean that can be effected. But it is very different as to the fat.

Obesity, fatness beyond certain bounds, is really a disease. It is not that degree of fatness to which reference is chiefly made here. Excessive deposit of fat which we perceive upon the exterior of the body is also present in the interior, and mechanically embarrasses the action of various internal organs. The heart is surrounded by a mass of fat, and its function is signally impaired. Respiration is retarded, and thus the process of oxidation of the blood is impeded. The liver is inactive, and substances which it should excrete remain in the organism of the body to its detriment. Exertion becomes laborious. The mechanical compression of the heart by a fatty cushion is finally succeeded by a diseased condition of the organ, known as "fatty degeneration." This tendency to obesity should be checked by increased exercise, careful selection of food, and massage. Massage removes fat to a certain extent, and strengthens the muscular system. The practice consists of four movements: friction, percussion, pressure, and movement. When pressure

and movement are combined, the action is known as deep kneading or rubbing. Each move produces its own specific effect, so that the best results are produced by a combination of the movements. Hearty eaters should place a curb on their appetites as to amount and quality of foods. Saccharine and farinaceous, that is, sugary and starchy foods, are to be avoided. Fat meat, cream, unskimmed milk, butter, vegetables, oils, nuts, fat fish, sweet fruits, should be taken in diminishing quantities. The use of malt liquors and chocolates must be entirely abandoned. The diet should be composed of lean meat, poultry, game, eggs, green vegetables (but not green peas, which are very fattening), acid fruits. The effect of such a diet, following an unrestricted one, is very evident within a short time; a person of a hundred and eighty pounds weight adopting it sometimes loses two pounds within twenty-four hours. Mr. Banting, of England, who was a very short man, and who was so afflicted with obesity that he had to go down stairs backward, reduced his weight, in about a year's time, from two hundred and two to one hundred and fifty-six pounds. There has been difference of opinion about the use of many liquids. According to some authorities, liquids generally are disallowed. Free allowance of water may, however, be looked upon as useful in the treatment, by promoting digestion and the oxidation of the blood.

Persistent care of the person, aided by due attention to the toilet, can effect wonders for personal appearance. Many a girl in the first bloom of youth, endowed with charming physical attributes, has speedily, under the influence of hard work, coarse food, and unrefined surroundings, lost all her physical charms. Prosperity and satisfied affections tend to promote and maintain beauty in both sexes.

When we use the term personal beauty we usually think of female attributes, although there are exceptions to that in both nature and art. The statue of the Apollo Belvidere is considered as beautiful for the male sex as the Venus de Medici is for the female one. The years between the eighteenth and

twenty-fifth are those during which, in this country, female loveliness is usually considered to be at its height. In warmer climates the range is between earlier years. The truth is, however, that each period of life has its characteristic charm, unless, indeed, persons of the opposite sexes reach the condition of the crone or the lean and slumped pantaloon.

In infancy, at the dawn of life, the child, when perfect in infantile form and features, has a signal beauty of its own. The skin of a well-nourished, healthy baby is so fine and soft, its flesh so firm, its face so delicately dimpled, its hands and feet so dainty, that no well-constituted mind can deny it the meed of beauty of its special kind. The great artists of religious paintings have shown in their works thorough appreciation of its loveliness. The first few years of childhood have also their special charm, from the toddling creatures to those grown to prattling in the newness of their world. The animated faces and gaiety of youth come in turn to gladden the eye. The maiden especially has been the theme of poets for generations, to none appealing in her innocence more than to Wordsworth, where he says:

“She was a phantom of delight
When first she gleamed upon my sight;
A lovely apparition, sent
To be a moment’s ornament;
Her eyes as stars of twilight fair,
Like twilight’s, too, her dusky hair;
But all things else about her drawn
From May-time and the cheerful dawn:
A dancing shape, an image gay,
To haunt, to startle, and waylay.
A perfect woman, nobly planned,
To warn, to comfort, and command;
And yet a spirit still and bright,
With something of an angel light.”

Tennyson, too, among modern poets, has given us a picture of a maiden when, amidst flowers, a shadow falls about her waist:—

"Ah, happy shade—and still went wavering down,
But, ere it touched a foot that might have danced
The greensward into greener circles, dipt,
And mixed with shadows of the common ground!
But the full day dwelt on her brows and sunn'd
Her violet eyes, and all her Hebe bloom,
And doubled his own warmth against her lips,
And on the bounteous wave of such a breast
As never pencil drew. Half light, half shade,
She stood, a sight to make an old man young."

Mother Eve we always seem to think of, because one of the progenitors of the race of men, exclusively as a matron in age and dignity of carriage; but she is not so portrayed in Milton's picture of her: —

"Under his forming hands a picture grew,
Manlike, but different sex, so lovely fair,
That what seemed fair in all the world, seemed now
Mean; or in her summed up, in her contained,
And in her looks, which from that time infused
Sweetness into my heart, unfelt before,
And into all things from her air inspired
The spirit of love and amorous delight.
She disappeared, and left me dark; I waked
To find her, or for ever to deplore
Her loss and other pleasures all abjure.
Grace was in all her steps, Heaven in her eye,
In every gesture, dignity and love."

But beauty of form and face is not reserved for maidenhood. Matronly beauty is also recognized by artists as being sometimes of the highest type, and even old age, short of decrepitude, may present a beauty of its own in nobility and majesty of countenance, or in the expression of the serenity which befits the decline of life.

The mistake sometimes, but rarely, committed by men, but frequently by women, is in attempting by dress and other devices to look younger than they really are. If such could only be

brought to realize that no devices are possible to conceal the changes of time, they would save themselves much labor and mortification. If they would only realize that each age has its own best manner and dress, that the changes brought about by time are not necessarily ravages, but are as natural as being born, and are those to which they should extraneously conform, they would feel younger, be younger, and would be happier, than in attempting false pretences which never deceive 'themselves or others. A matronly face surmounted by a girl's hat, or a matronly form corsetted in an attempt to imitate a girlish figure, are as perceptible in their pretense to even the casual observer, as anything that may arrest his glance, and not less the affectation of youthfulness accompanying the dress. On the contrary, the matron as the old lady, appropriately gowned and mannered, has charms especially belonging to her time of life, which not even youth can exceed or more than rival. A refined face of either sex, grown mature amid the lessons of life in hope, love, sorrow, duty, has a beauty bordering on the supernal, and therein lies its charm.

CHAPTER VI.

WORLD INFLUENCE OF WOMAN'S CHARMS.

IT has been reserved for one of the follies of modern thought to assert and to maintain that, if women should come to rule the world, it would be better than ever heretofore. Such a belief is one of the wildest assumptions, not only not borne out by everyday experience, but positively contradicted by the history of ancient, mediæval, and modern times. The exact truth, known from experience, is, that men and women are equally capable of virtue and of depravity; that virtue and vice lie in the individual, irrespective of sex; that they tend to be promoted, retarded, or checked, as the case may be, by the myriad circumstances involving life through the influences which pervade it from the cradle to the grave.

Homer, who lived at least nine centuries before the Christian era, takes us back, in his epic poem of the Iliad, to the earliest known history of an illicit love that affected the course of empire. The Trojan, Paris, one of King Priam's sons, carried off the Greek, Helen, wife of Meneläus, King of Sparta. The poem is, of course, fable, but based on fact. In the territory of the Troad, forty miles long by as many broad, overlooked by Mt. Ida, in the northwest angle of Asia Minor, the Greeks' long siege of Troy, for ten years, was pushed, until the city, with the faithless wife, was captured. A duel occurred between the wronged husband and Paris, a duel between Hector, a brother of Paris, and Achilles; and other single combats and various battles, in which some of the gods had so intimate an interest as often to take part. The site of the comparatively late excavations of Dr. Schliemann, revealing an ancient town which he supposes to have been Troy, do not agree with Homer's account of the beetling loftiness of the city. But the question is apart from the matter here, which simply is, that, in the earliest times, the flight of a

beautiful woman with her paramour was the cause of the banding together of the various sovereignties of Greece, under Agamemnon, the so-called "king of men," the brother of Menelaus, to recover the unchaste woman, and to wreak vengeance on her abductor and protectors.

At a much later date, when we come within the distinctively historical period, the age of Pericles, in the fifth century before Christ, the time when Athens, under the wise administration of Pericles, rose to the highest point of her greatness, we find that he divorced his wife in favor of the *hetaira*, Aspasia, with whom he lived for the rest of his life. She was the most intellectual woman and one of the most beautiful of her time; but one who, not being Greek, was to the Greek of the period, a barbarian, and, as such, unmarriageable by a Greek. She was so wonderfully gifted in mind, and so well-informed, that even Socrates did not disdain intercourse with her among the persons who thronged to the house of Pericles to acquire knowledge from her lips. To the class of *hetaira*, the nearest modern approach is that of the *demi-monde*, of Paris. The *demi-monde*, however, has not with it equal excuse for dissolute life, for the *hetaira* were recognized in those heathen times as forming a class to which was attached no particular disgrace. Highly endowed physically, and cultivated in mind and manners, their mission was ministration to the amusement of men; slaves they were, one might almost say, to circumstances over which they had not full control, and, as such, they may be regarded as comparatively innocent.

Coming to an episode closely bordering in time upon the Christian era, we reach the most remarkable influence of a woman upon men generally to be found in history. Cleopatra, the Serpent of the Nile, as she has been called, was a woman intellectual, highly educated, and sensual. With a lot cast in Egypt, amidst depraved family surroundings, and internal as well as external difficulties of reign, so consummate were her talents, her acquirements, and her personal charm, so unscrupu-

lously did she use all means at her disposal for the maintenance of herself in power, that nothing but untoward circumstances, which she could not control, led at last to her overthrow and suicide. When it is said that she had charm which only one man, Augustus Cæsar, seems to have resisted, it does not imply that she was beautiful. There is reason to believe that, although handsome, she was not beautiful. What she possessed in the supremest degree, is what the French aptly call *le charme*, the wholly unanalyzable power of attraction with which some few mortals are gifted. Shakespeare best explains its manifestation in her when he says that "age could not wither nor custom stale her infinite variety." Caius Julius Cæsar first met her when he was in pursuit of Pompey in flight to Egypt. But he was too great a man to come under her dominion. He took her to Rome, to the great displeasure of its citizens. Much later, after the assassination of the great Cæsar, Marcus Antonius, or, as we call him, Mark Antony, who was of entirely different fiber, became her veritable slave. After the assassination of Cæsar, Octavius, afterwards known as Augustus Cæsar, Mark Antony, and Lepidus divided the Roman Empire among them, Mark Antony marrying Octavia, Augustus Cæsar's sister. Antony, however, within his apportionment, the Empire of the East, soon fell away from Augustus, and deserted Octavia in favor of Cleopatra. Long before that, Cleopatra had made his acquaintance, rowed up the river Cyndus, in Syria, reclining in a gorgeous galley of many banks of oars, amidst music and flowers, a scene which has often been pictured. At the sea-fight of Actium, one of the turning battles of the world, Cleopatra fled in her galley, followed by Antony, when the result of the control for the world's supremacy was still doubtful. The scene soon afterwards closed on both. Cleopatra, faithless even to Antony, vainly attempted to subdue Augustus to her charm, and the curtain fell upon the scene by the suicide of both ignoble lovers.

John Churchill, Duke of Marlborough, A. D. 1650-1722, is recognized as among the very highest of the second order

of great generals: Hannibal, Cæsar, and Napoleon being of the first. His wife, the Duchess, was Sarah Jennings, a woman of remarkable talent and energy. The times were politically scheming and traitorous, and both were not among the least who plied the acts of treachery to their own aggrandizement. So great ascendancy was acquired and long maintained by the Duchess over Queen Anne, of England, that it amounted to tyranny, which she, at last, carried to so great lengths, that she lost place and power at court. To the Duchess's talents and imperious conduct are justly ascribed much as to both the rise and the fall of the Duke of Marlborough's ambition. She was true to him to and beyond the end, spending the last days of her life in seeking to vindicate his memory.

In the reign of Napoleon two women appear, of very different stamp from those previously mentioned; of influence, but of no direct influence with the ruling power—quite the reverse. Madame de Staël and Napoleon heartily disliked each other. Madame de Staël was exiled, and her intimate friend, Madame Récamier was also exiled. Of Madame de Staël, as thinker and writer, Napoleon did not approve. When Napoleon sought to give his imperial surroundings the brilliancy of good society, he tried to attach Madame Récamier as lady-in-waiting to the court, but she declined the honor. She was the most beautiful woman of her day, and in addition to the charms of her person had so amiable a disposition that she attracted every one who came within range of her acquaintance. Nothing is more frank and outspoken than the verdict of the typical boy upon everything within and beyond his comprehension, and Madame Récamier herself tells us, that when her beauty was on the wane, she knew it well, because the *gamins* of Paris no longer crowded near to gaze upon her. Madame d'Hautefeuille says of Madame Récamier: "To be beloved was the history of Madame Récamier. Beloved by all in her youth for her astonishing beauty; beloved by all for her gentleness, her inexhaustible kindness, for the charm of a character which was reflected

in her sweet face; beloved for the tender and sympathizing friendship which she awarded with an exquisite tact and discrimination of heart; beloved by old and young, small and great; by women, even women, so fastidious where other women are concerned; beloved always and by all from her cradle to the grave, such was the lot, such will be the renown, of this charming woman!"

One might go on indefinitely with citation of cases where women have influenced, sometimes for good, sometimes for evil, the course of society, of politics, and the destiny of empires. The most flagrant of modern times, in the direction of evil, was that during the reign of the mistress-ridden Louis XV, where Madame de Pompadour, one of his many female satellites, even brought about war, because Frederick the Great of Prussia had characterized her by the name which she deserved. The evil of that reign did not, indeed, cease with the death of the King, but went ever onward to its culmination in the French Revolution. It was not always, as has been intimated, that the influence of woman has been injurious to government. Let us look back for a moment to the wonderful woman, Theodora, who lived in the fifth century of the Christian era, and reigned, conjointly with her husband, Justinian, for many years over the Byzantine Empire.

Theodora was a daughter of Acacius, a bear-feeder of the amphitheatre at Constantinople, of the faction of the city called "the blues." Doubtless her early life was dissolute, it could hardly have been otherwise on the stage of the Byzantine Empire. Procopius gives her a bad character in this respect, but there is reason to believe that his account of her is exaggeratedly malicious. Anyhow, whatever may be the truth about her earliest years, surrounded by tainted influences, she seems to have entirely redeemed herself. At the death of her father, Acacius, he left a widow with three daughters, of whom Theodora was one, at that time five years of age. The widow, remarrying, thought her second husband should be appointed to

the place which her first had held. The appointment, however, went to another man. In the hope of having the decision changed, the widow sent her three little daughters to the Amphitheatre to seek the support of "the blue faction." That faction received them with favor, but their opponents in politics, "the green faction," treated them with contempt. This occurrence made so profound an impression on the mind of Theodora, that it contributed, in the course of time, to serious consequences.

When old enough, Theodora went upon the stage, but as she had nothing but her wonderful beauty and some comic ability to attract in that sphere, no histrionic talent, and could neither dance, sing, nor play upon the flute, she made an impression confined to pantomimic performance. "Theodora," says Gibbon, the historian, "was the subject of more flattering praise, and the source of more exquisite delight. Her features were delicate and regular; her complexion, though somewhat pale, was tinged with a natural color; every sensation was instinctively expressed by the vivacity of her eyes; her easy motions displayed the graces of a small but elegant figure; and either love or adulation might proclaim that painting and poetry were incapable of delineating the matchless excellence of her form."

The reader probably inquires, why, with all these graces and temperament, Theodora failed as an actress. But it is a matter of history that she did so fail, and it is that with which we must here be content. In a few years she abandoned the stage and, it is reported, made her livelihood by spinning; perhaps, as suspected, with the intention of reformation of her life. She seems to have had some premonition of her future greatness, and managed in some way or other to attract the attention of Justinian, the heir-apparent to the throne of the Byzantine Empire. Her extreme beauty was a fact that no one could doubt, but, additionally, she had ability of the first order, and she completed the infatuation of Justinian for her by her conduct and understanding. Her influence over him was so deep and lasting, that he resolved to marry her. Two difficulties presented themselves

to this: the opposition of Justinian's aunt, Euphemia, and the law, which forbade the marriage of a senator with one who had been an actress. However, upon the death of the aunt, the ruling monarch, Justin, yielded to the solicitations of Justinian, his nephew and heir, and the law was repealed, and Theodora, who had been previously elevated to the patriciate, was married to Justinian. After the death of Justin, Justinian became Emperor in his stead, and conferred the imperial dignity upon Theodora, announcing her to the world in the following terms: as "an equal and independent colleague in the sovereignty of the Empire." She had, among her high attributes, the inestimable quality of courage, as appeared later on a signal occasion.

Justinian carried on several wars, adorned Constantinople and other principal cities of the Empire with many beautiful buildings; he improved harbors, built bridges, executed fortifications, and to his initiation the modern world owes the consolidation of Roman law known as the Justinian Code. Yet, with all the advantages of birth, education, and personal character, Justinian might not have stood so high in history as he does, but for his extraordinary wife, Theodora. Beginning almost from the time of the death of Christ, heresy had been rife, and theological controversies carried on with the greatest acrimony, and they, of course, were complicated with the politics of both the Eastern and Western Empires, into which the Roman one had become divided, whilst paganism had by no means ceased to be a power. Since the severance between the East and the West, barbarians had constantly assailed the borders of the two Empires, and had even penetrated the interiors of both. The ancient martial spirit and military skill of Greeks and Romans seemed to have almost departed, and the tottering Empires depended upon the most precarious of supports, on the arms of mercenary barbarian soldiers. The leaders of these, with their hordes, had sometimes settled in the country, and by conquest or election ascended the thrones of the East and the West. The inhabitants of both capitals were given up to ener-

vating luxury. Foreign conquest and domestic tyranny were secondary in their minds to ease and publicly provided amusements. In Constantinople, the center of popular interest was the amphitheatre. In the chariot races of the Greeks, it had become customary to distinguish competitors by different colored ribbons, white, red, blue, and green. Spectators were divided into factions about the contestants. The strife of "blue" and "green" was not confined to the arena; it divided friends and families, whose enmity sometimes broke out in riot and assassination. This is the world into which, it may be said, Theodora was born, and in which, at five years of age, she received her greatest rebuff.

In A. D. 532, about five years after her marriage to Justinian, factional hatred blazed forth in Constantinople in a terrible insurrection. Unforgetful of the contempt with which she and her sisters had been treated by the faction of "the greens," when they had appeared as supplicants in the amphitheatre, Theodora had always since favored the faction of "the blues." There was great destruction in the city, and enormous loss of life. For a time, indeed, it seemed as if the Empire were to be lost to Justinian and Theodora, for the Emperor and Empress, the Court and Belisarius, the greatest general of the age, were hemmed in the palace by the mob, and there was talk of flight by the waters of the Bosphorus. But the resolute Theodora said: "If flight were the only means of safety, yet I should disdain to fly. Death is the condition of our birth, but they who have reigned should never survive the loss of dignity and dominion. I implore heaven that I may never be seen, not a day, without my diadem and purple; that I may no longer behold the light, when I cease to be saluted with the name of queen. If you resolve, O Cæsar, to fly, you have treasures; behold the sea, you have ships; but tremble lest the desire of life should expose you to wretched exile and ignominious death. For my own part, I adhere to the maxim of antiquity, that the throne is a glorious sepulchre." Reassured by the tone of Theodora, braver

resolutions prevailed, means were taken through which the fury of the rival factions was entirely directed against each other, Belisarius placed himself at the head of some royal troops, and surprised the forces of the malcontents in the amphitheatre, and the fires of the insurrection were quenched.

Theodora's views seemed to have had much to do with moulding Justinian's policy. There were times when dissension arose between them, but those who sought to part them did it at their cost. Her health, always delicate, at last became critical. Her medical advisers recommended her resorting to certain famous baths. She set forth, accordingly, with a splendid retinue, upon roads that had been specially prepared for her easy progress, lavishly distributing gifts on the way to churches, monasteries, and hospitals. She died in the twenty-fourth year of her marriage and the twenty-second year of her reign. Justinian deeply deplored and grieved at her loss. He survived her fourteen years. His long reign was brilliant, but added no strength to the Byzantine Empire. He is now chiefly remembered by his Code of Laws.

Is it asked why the present writer has dwelt so long upon the history of Theodora? The question is easy to answer. She seems to him, considering the obscurity of her birth, her unfavorable early training, her intellect and spirit, her rise to the responsibilities of supreme power and its exercise for many years, to have been the most extraordinary woman whose deeds history records. She was, whether with truth or not, charged with having been unscrupulous and even cruel, but those accusations were made by Procopius, upon the truthfulness of whose account modern historians have thrown doubt. But, even assuming that his accusations are true, and not inspired by malice, she still remains a most extraordinary woman for excellent traits of character fitting her for the station which she occupied in most troublous times. Cite another, who may, who is her equal.

Of comparatively very recent years, the province of history

has been much extended, through recognition that the life of peoples, more particularly than that of rulers, ought to be its principal theme. Macaulay states this modern point of view with great precision and force. It is now perceived that accounts of the lives, occupations, aspirations, and literature of the mass of any people are of more importance to their history than are narratives upon which the name of history was formerly exclusively bestowed. The life of a nation does, in truth, depend upon its component parts; that is, more particularly upon the persons who go to form the people as a whole, than upon their rulers. The power and stability of a nation depend at bottom upon the principles by which, good, bad, or indifferent, the mass of the people are actuated. The policies of all governments must, as a finality, depend upon those principles which actuate the will of the people.

Accordingly, the physical, mental, and moral gifts of woman have had, among other things, a widespread influence upon the affairs of the world. Beauty alone, it will be observed from consultation of history, has rarely achieved success in great affairs. It is when beauty has been associated with high, sometimes the highest, intellectual and moral attributes, that it has worked the wonders of which history is full. It is one of the most admirable of possessions, it is by its nature so captivating that the observer, despite experience, is always inclined at the first glance to associate with it intelligence and other worth. But, alas, by another law of our nature, when it is found that other fine attributes are absent, it not only palls upon us, but even excites in the mind most unreasonable contempt! The women, in a word, who have commanded and command the admiration of a society, or of the world, through their gifts of mind, have been even plain. She, however, who has been prominent in mind and virtue, and has been, additionally, beautiful, has had the best opportunity to touch the summit of power, whether as a leader of society or one ambitious of a throne.

CHAPTER VII.

EXPRESSION, SEXUAL ATTRACTION, WEDLOCK.

FROM the time of Aristotle, and probably long before, to that of Lavater, the great physiognomist, the expression of the human face has been considered as significant of character. The science of expression is not a spurious one, like that of phrenology, which pretends to mark off the skull into little lots indicative of particular attributes of the underlying patches of brain. It is based upon experience of life; for, although even a virginal face may be falsified by sensual character, yet, if its owner lives long enough, the true history of feeling and action will become indelibly written on its once pure lineaments. In vain does the professional gambler reach maturity without his calm, watchful face, and quiet, shark-like eye betraying his occupation; in vain does the thief try to conceal by frank look, his furtive eye and ways. That we may all be sometimes mistaken in judgment from expression is well known and by every truthful person conceded; but it is our own fault or misfortune when we fail.

Lavater, who studied the subject more intimately than any other man who ever lived, tells us that when, on a certain occasion, a man was announced to him whom he had never before seen, the stranger, upon appearing, was believed by him, at the first glance, to be a murderer. Censuring himself, however, as he says, for what he persuaded himself must be an unjust thought, he entered into conversation with his visitor. The stranger turned out to have been implicated in the assassination of the King of Sweden, and was obliged to flee from Zurich. Lavater gives the following as an incident coming to his knowledge. A friend of Count F's one day was about to go, at the end of a visit to him, when the Count locked the door to prevent his egress, telling him that he was meditating a crime. The friend, astonished and unnerved, confessed that the Count had

guessed right, surrendered his concealed weapon to him, and elicited his pity by the sad tale he told of what had inspired his intended crime. Time was when physiognomical traits were resorted to for divination, but, since the decline of superstition, that practice has almost fallen out of memory. It is, nevertheless, true that all men who have acted great parts on the world's stage have been gifted beyond their fellows in the divination of the character of their subordinates, through their capacity of reading the significance of facial traits. The whole world is addicted, consciously or unconsciously, to the same divination, but with less skill in interpretation of the signs.

Lavater writes: "For the rest, whatever genius may be, its character and nature will always be best revealed by the eye. Search for it in the look, properly so called, in the fire which animates it, but above all, the drawing of the upper eyelid, considered in profile. All other distinctive signs being absent, I shall always hold to that which has never deceived me. I do not consider that I have looked at a man until I have noted this contour. If this single feature is positive and decisive, all the rest matters very little to me. If sometimes it so happens that I have not the time or the opportunity to study a physiognomy well, I at least observe the upper eyelid One word more on the look of a man of genius. First, I shall point out a peculiarity which is neither very frequent nor very marked, and which is the more difficult to reproduce in drawing, on account of its rarity. In addition to those gleams of fire, those penetrating and rapid flashes, which may be explained in a certain manner by the conformation of the eye, that of the man of genius has *emanations*. . . . I do not speak of substantial emanations, which would be an absurdity. I still less pretend to determine the nature of these emanations; but I refer them to a circumstance of fact which has become proverbial, which is confirmed by experience, and which can only, again, be called into doubt if we admit a difference between colors I find, again, the evidence of this look in the portraits of Cardinal Retz, of Van Dyck, and of

Raphael. The look of genius, with all its fire, is irresistible, miraculous, divine."

Mantegazza, a very modern Italian writer, when referring to this passage from the works of Lavater, remarks: "For my part, I dare affirm, after long experience, that men of genius may have existed as ugly as Æsop, and beautiful as Raphael or Goëthe; but all have had a fiery, indefinable look which is never met with in an ordinary man, and in which seem to be concentrated all the enthusiasms of life, all the splendor of light, all the energy of thought and of will."

These remarks of Lavater and Mantegazza, on the subject of the expression of the eyes of the man of genius, are well confirmed lately by a particular case cited by Monsieur Paul Villars, a French journalist, who has lived twenty years in London. Speaking of an occasion when he went to Scotland, during Mr. Gladstone's Midlothian electoral campaign there, and was placed only two seats away from him at luncheon, Monsieur Villars writes in "The Cornhill Magazine," July, 1906: "Two things especially struck me in Mr. Gladstone: his voice and, most particularly, his eyes. In no one else have I ever seen anything to compare with his brilliant, piercing, black eyes, so full of fire and energy, with that searching look of his which seemed to penetrate to the very soul of the person he was addressing."

How evil passions, as well as good, write their history on the face, is well illustrated by the story of an Italian painter who long sought a perfect form from which he might paint an ideal type of Innocence. He at last discovered one in whom was found, in form and feature, all that could be desired. Years later, wishing to paint, in turn, the very opposite type of human being, representing Vice, he discovered his villainous subject in the depraved man who, as a little child, had posed as Innocence.

The effect of intellectual thoughts and pursuits in ennobling expression is well condensed by Shakespeare's single line, "sicklied o'er with the pale cast of thought." What a contrast is afforded in Europe between the faces of the educated and

those of peasants and boors! It is a transfiguration through which persons sometimes go in emerging from low to higher estate. Features may be, in any man, structurally the same among their component parts, but what a vast difference there is between the expression of intellect and refinement of some, contrasted with the stupidity and brutality of others, between gentility and vulgarity, between nobility and coarseness. And, when it comes to genius, who that looks dispassionately, free of the prejudices of life, upon the living face of greatness, or upon its counterfeit presentment in portrait, can doubt that its possessor holds or held transcendent superiority to the mass of mankind.

It is told of Monsieur Kubisee, who, passing with some friends through a house, was so struck by the portrait of a beautiful woman, that he was found an hour afterwards still gazing at it intently. "What do you think of the picture," said his friend, Monsieur Langes, who had returned to find Monsieur Kubisee, "is it not that of a beautiful woman?" "Without doubt," replied Monsieur Kubisee, "but if it is like, the person that it represents has a very black soul—she must be a demon." It was a portrait of Madame de Brinvilliers, a woman of station, but one of the most dreadful criminals who ever lived. She had poisoned her father, brothers, sisters, and others, to glut hatred and acquire means for profligacy. She was executed in the reign of Louis XIV.

Pride, anger, cunning, serenity, doubt, anxiety, courage, cowardice, resolution, weakness, cheerfulness, all emotions and passions that are habitual, gradually set their seal upon the expression of the human face. Even modes of life have their influence on character and appearance. Most persons recognize at a glance the expression of the soldier, the sea-captain, the common sailor, the priest, the sister of some religious order. These effects are produced by the influence of diverse habitual thoughts and impressions upon the small muscles of the face. These, although, upon certain occasions, controllable by the

will, are not generally so controlled. They are habitually moved by the play of unrestrained emotional habit on the part of the individual. Small as the muscles are, compared with the muscular masses of the body, they are large enough to be separated from one another and their action demonstrated by the teacher of anatomy. All muscles contract in response to impulses transmitted to them by nerves, and nerves receive their impulse from the emotions conveyed from the brain. The facial muscles are, of course, controlled by the facial nerves, of which there is a main branch on each side of the face. From these main branches numerous smaller ones ramify to all parts of the face. The nerves, connected directly with the brain, are therefore fitted to transmit with rapidity the impulses of the mind known as emotions and passions.

Hence comes the influence of the mental condition, or, if it be habitual, the mental state, upon the countenance, when certain trains of thought are either temporarily present, or else habitually reign in the mind. Upon these nerves are thus impressed habits of thought transmitted to their corresponding muscles, which, in turn, mould the face to certain contours which mankind have learned to recognize as wanted affections, which, summarized, mean character. We can scarcely ever, in judging from a face as to character, make so egregious a mistake as not to discern whether or not the person is kindly, cross, generous, mean, or possesses other salient traits. In persons of pleasant temperament, the expression is so marked that even children recognize it. The mere glance of a well-bred man is more effective than any play of features of his imitator. There is a noodle portion of mankind, among both men and women, but especially among men, which cultivate the *nil admirari* aspect of inane fixity of look as well as curtness of speech, but, being of spurious refinement, it has no influence upon the world save to excite its ridicule. The theatre of its small existence is insular, provincial, or in cliques in big cities where the actors have no recognition but their own. Men and women may be

properly reserved among chance acquaintances, but anything like assumption of aloofness is vulgar.

Just as the artist, whether sculptor or painter, has the power, through nature and practice, to portray characters through form and color, so the gifted novelist possesses the same kind of power in the sphere of literature, and both of them so far transcend, in observation and skill in delineation, the mass of mankind, that mankind recognize in themselves but worshippers at shrines to which they can make no contributions. The novelist possesses in high degree, not only the gift of expression, but that of discernment of character beyond the capacity of the multitude. In "Romola," by George Eliot, the portrait which Piero Di Cosimo makes of Tito Melema is inspired by a single transient expression of Tito's which the artist has casually caught on the villain's face. This expression had been produced by the unexpected appearance before him of one whom he had wronged and had thought dead. "His face," said Piero, "will suit my traitor. A perfect traitor should have a face which vice can write no marks on, lips that will lie with a dimpled smile, eyes of such agate-like brightness and depth that no infamy can dull them, cheeks that will rise from a murder and not look haggard. I say not this young man is a traitor. I mean he has a face that would make him the more perfect if he had the heart of one." Tito was young and handsome. Length of days had not yet had time to write permanently on his face the record of his villainy, one fleeting glimpse of which he had accidentally revealed to the artist-eye of Cosimo.

The rapid improvement in character and expression, brought about by participation in great events, is well portrayed by Hawthorne in his posthumous unfinished romance, "Septimus Felton." "Septimus," he writes, "looked at Robert Hagburn in surprise, so much was he altered and improved by this brief experience of war, adventure, and responsibility which he had passed through. Not less than the effect produced in his loutish, rustic air and deportment, developing his figure, seeming to

make him taller, setting free the manly graces that had lurked within his awakened frame, not less was the effect on his mind, giving freedom of ideas, simple perception of great thought, a free and natural chivalry, so that the knight, the Homeric warrior, the hero, seemed to be here in the young New England rustic, and all that history and fiction have given and hearts throbbed and sighed and gloried over, of patriotism and heroic feeling and action, might be repeated, perhaps, in the life and death of this familiar friend and playmate of his, whom he had valued not over-highly—Robert Hagburn.” These transformations, or rather developments of character, of expression and of hearing, were abundantly exemplified during our Civil War. Bumpkins who went to the front often reappeared after drill, discipline, and the fiery ordeal of battle, with well-set figures, confident looks, resolute eyes, and modest but martial bearing. Under the stress described, the whole mental and bodily organism is stimulated to development. It searches out and protects manly traits, and weeds out the ignoble from fellowmen. The fact is one of the chief compensations for the many horrible realities of war, for long peace has its victims of the sordid kind, in greed of money and all that that entails.

Refinement and kindness indisputably create an attractive expression of countenance. The complexion, as has here previously been said, depends upon a fine skin, good health, and cleanliness. Therefore, as was also said at the beginning, good looks depend, to a considerable extent upon our own wills. In persons of highly nervous organization, the lines of the face are constantly changing in response to thought and emotions. If, upon the basis of natural faculties, these be directed in wider channels than those which minister to vanity and undue pursuit of amusement, which does not always prove to be pleasure, an air of distinction becomes inevitably stamped upon the features. Mobile features then possess a charm largely independent of mere symmetry. So endowed, both men and women are handsomer in mature years than they ever were in extreme youth. Many

pretty, frivolous girls, who spend most of their thought and time in gaieties, and sacrifice rest to excitement, disappoint in looks the promise of their early years. They may have had, at the beginning of life, what is called "*la beauté du diable*," the devil's beauty, only the beauty of youth. They fade rapidly, and reveal at twenty-eight years of age the vapidity of expression that had been masked in them at eighteen by youth. On the other hand, dispositions that lead, unchecked, to the perfection of indifference in pose of features, do not invite admiration or love for the underlying character of the possessor. Tennyson writes:—

"But a cold and clear-cut face, as I found when her carriage
past,
Perfectly beautiful: let it be granted her: where is the fault?
All that I saw (for her eyes were downcast, not to be seen),
Faultily faultless, icily regular, splendidly null,
Dead perfection, no more."

Madame de Sévigné, one of the handsomest women of her time, the time of Louis XIV, would not have had the remarkable social and political influence which she exercised, but for her charms of mind, heart, and manners. Her daughter, Madame de Grignan, although considered beautiful, had but indifferent success at Court and elsewhere, and long before she died, was well known for her cold, thoroughly selfish nature. Of Madame de Sévigné, her intimate friend, Madame de Lafayette wrote to Madame de Sévigné herself: "Your varying expression so heightens and adorns your beauty, that there is nothing so brilliant as yourself; every word you utter adds to the brightness of your eyes, and while it is said that language improves only the ear, it is quite certain that yours enchant the vision." It was said of Madame de Staël, of the time of the first French Empire, a brilliant woman, but no beauty, that her knowledge, wit, and vivacity so shone in her face as to excite admiration. Sismondi wrote of her: "To hear her one would have said that she was the experience of many souls mingled in one. I looked

and listened with transport. I discovered in her features a charm superior to beauty, and if I do not hear her words, yet her tones, her gestures, and her looks convey to me her meaning." Yet Madame de Sévigné was not perfectly beautiful, she had a rather blunt nose, and Madame de Staël was decidedly plain from the point of view of pleasant symmetry of features.

We insensibly classify faces as tender, merry, arch, thoughtful, amiable, and in many other ways, with reference to the general impression that they make upon us. In the presence of decided beauty we do not analyze its charm. We judge of its attributes collectively. Later, we may become aware of something in it faulty in form or color. Indeed, it sometimes happens that a defect, such as a slight cast in one eye, presents itself as an attractive expression. As for the simultaneous and instantaneous attempt at insight into character, we must be aware that, from time immemorial, men, women, and children must instinctively have sought knowledge of character from the expression of the face. Faulty as the judgment often is, yet even very little children often guess aright from the signs who are the friends of childhood. Even the dog seems to divine who is a lover of his kind. That is the general truth, notwithstanding that all, at times, make mistakes, that one may justly come to like another who was at first repugnant, and as justly come to dislike another for whom at first was felt great attraction. The true signs are always present, but he who runs does not always read aright.

Sir Walter Scott, in "Peveril of the Peak," speaks of a "feeling in the human mind, allied, perhaps, to that sense of danger which animals exhibit when placed in the vicinity of the natural enemies of their race, and which makes birds cower when the hawk is in the air, and tremble when the tiger is abroad in the desert." Goethe makes Margaret have an intuitive apprehension of Mephistopheles. In one of his poems, Coleridge writes:—

"And yet Sarolta, simple, inexperienced,
Could see him as he was, and often warned me!
Whence learned she this? Oh, she was innocent!
And to be innocent is Nature's wisdom.
The hedge-dove knows the prowlers of the air,
Feared soon as seen, and flutter back to shelter.
And the young steed recoils upon its haunches,
The never-yet-seen adder's hiss first heard.
Oh, surer than suspicion's hundred eyes,
Is that fine sense, which, to the pure in heart,
By mere oppugnancy of their own goodness
Reveals th' approach of evil."

Beauty is an attribute which we mentally refer more to the female than to the male sex. Man, no less than woman, however, may possess beauty; but whether devoted to active or to sedentary mode of life, what is chiefly valued in men by the whole world is not beauty of features, but strength of body and mind coupled with corresponding looks. Mere symmetry of features in man, without expression of energy in face, is a reproach to manhood. The curled and perfumed barber's block and darling of the vulgar girl, excites the contempt of all manly men and refined women. What is, in a man, known as effeminacy is an attribute out of place in man, and makes of a man as much a monster, as manly traits in a woman make her among the most forbidding of her sex. Character, strength of body, are what, rightly constituted, women most admire in men; tenderness, beauty, grace, sprightliness, what men most admire in women. The noblest artists whom the world has seen knew how to represent manhood, with its beauty of form and expression of energy. The impress of thought upon the male countenance is recognized as more than mere animal beauty appropriate to man. The facial muscles surround the eyelids and the mouth, are attached to the corners of the nose and lips, to the forehead, cheeks, and skin. According to their action, they raise the skin of the upper forehead and of the upper eyelid to an expression of expectancy or surprise, contract the brows into a frown, draw

up the lip in a smile of pleasure, or contempt or sneer, pull down the corners of the mouth, giving an air of dejection or of melancholy to the face. It ought to be readily seen why, if certain movements become habitual to the exclusion of others, the face eventually acquires an expression that is indelible.

It is care and worry or disease and vice that make the greatest ravages in the human face. No one can pass through life without his or her nervous system being heavily burdened by unavoidable afflictions. But, besides legitimate care, which none but those without conscience can escape, there is spurious care, the outward sign of which is known as worrying, which, however illegitimate from the highest point of conception of duty, leaves its traces in a discontented countenance. As for the brand of vice, it sears slowly but deeply the human face, until its victim, whether man or woman, stands revealed to the humblest observer, not only as to the fact, but as to the very kind of moral deformity present.

Human expression of face is moulded to a certain extent by the influence of surrounding expression. The writer once saw a boy, the son of American parents, who had been born and lived in China, and who, when he arrived in this country, had a Chinese expression of face that did not leave him for several months. Habits of life, diet, pursuits, beget similarity of expression and manner. We are seldom at a loss to identify an Englishman, Frenchman, German, Italian. Individual features may vary among these and among those of other nationalities, but we settle the nationality of the persons with the utmost confidence before we hear their speech. Among happily married persons, the resemblance between husband and wife often becomes so marked that they are taken for brother and sister. This influence of human expression was noticed by Lavater. He says: "It happens to all to acquire the habits, the gestures, the face of those that they see familiarly. We assimilate ourselves in some degree to all that we love; and of two things, one;

either it is the loved object which moulds us to himself, or it is we who seek to mould him to us. All that is without acts upon us and suffers some reciprocal action from our side; but nothing reacts upon our individuality so efficaciously as that which pleases, and nothing, indubitably, is more lovable or more fitted to move us, than the face of man. That which makes it lovable to us is precisely its harmony with our own. Would it be able to influence and attract us if points of attraction did not exist which determine the conformity, or at least the homogeneity, of its forms or its features with our own? I shall not essay to penetrate the profoundness of this incomprehensible mystery. I do not pretend to resolve the difficulty of the *how*; but the fact is certain, there are faces which attract, as there are others which repel; the conformity of features between two individuals who sympathize together, who are often together, corresponds with the development of their particular sensations. Our visage keeps, if we may thus express it, the reflection of the loved object."

The only qualification necessary to make to these views of Lavater's is that the assimilation of which he speaks is rarely, instead of commonly, as he seems to think, a conscious one. Affection or admiration, as the case may be, are almost universally the unconscious agencies which bring about likeness. The action, moreover, cannot be called reciprocal; it comes from one side stronger than from the other, so efficiently to the exclusion of effect from the other, that we may justly consider one side as relatively the one loved or admired, so much does it predominate in efficiency. *Il-y-a toujours un qui baise, et l'autre qui tourne la joue*, says the French proverb. There is always one who does the kissing and the other who permits it. There is no such thing as perfect equality in the universe. A wife has been known to acquire penmanship so much like her husband's that it was almost impossible to tell their writing apart. It is the dominant being in any association among mankind, regardless of sex, who is unconsciously imitated, from either love or ad-

miration. Intentional imitation is comparatively rare. That it occasionally takes place, is all that can be truly said. The law that we have been discussing goes much deeper than that consideration. A case of unconscious imitation which ought to be recognized, so plain it is, by even the least observant, is that of manners. Manners, not manner (for that belongs to temperament), are chiefly, almost wholly, derived from unconscious imitation. We find, throughout all social spheres, different expressions of the face, different forms of speech, different tones of voice, different subjects of interest and conversation. The extremes of society do not readily understand each other's moods at all, unless the highest happens on occasion to hold philosophers; the lowest never does hold philosophers, and understand, except in the vaguest way, the others.

The human face indicates at maturity, not only the character, but the degree of culture of an individual. The blended effects of intellectuality and morality in the individual form the highest attribute to which the human face can attain. Yet, blended as they may be, and often are, they are inseparable to observation. The most unlettered, ignorant person may give evidence in looks of high morality in character. Some persons are by nature more strongly drawn to contemplation of morality, and others by the same initial impulse to intellectual exercise. The constant contemplation of duty, the exercise of beneficence, give an air of serenity to the countenance, while exercise of thought on the various problems of life gives a loftiness of expression not otherwise attainable. The celebrated French author, Diderot, remarks that there is scarcely a moral maxim which may not also serve as a medical aphorism, and that there are very few medical aphorisms which cannot readily be converted into moral maxims. This dictum of his merely means, in effect, that the law of life for the well-being of humanity pervades both the bodily and moral elements of mankind, that one cannot be injured but at the expense of the other. The complexity of human life involves intellectual, moral, and bodily being, acted

upon and being reacted upon by the individual's surroundings in life.

Moderation, temperance in the use of all things, is one of the highest laws of life. When not by nature endowed with tendency to practice it, one should sedulously school himself to follow it as the only safe guide for mental, moral, and bodily welfare. We should study ourselves, morally, intellectually, and physically. We differ in evil propensities, and differ in strength of mind to control them. Some persons are so happily constituted by nature that they scarcely realize, as compared with others, the meaning of temptation. Such pure beings, when they happen to realize it, shudder at the thought of doing wrong, and have a horror of committing positive sin. They have no ill-regulated desires through which temptation may assail them. From the face of a thoroughly good man or woman seems to beam an expression recognizable by the most corrupt, who, like the fallen angels, "believe and tremble." Spenser has, in his "*Faerie Queene*" typified, in Una and the Lion, the influence of simple goodness and innocence over passion.

A fatal blindness to physiognomical signs may grow out of sexual attraction. Anyone who has lived to even very moderate length of life cannot but have observed that love at first sight is a very uncertain guarantee of permanent passion for the objects of affection. The whole being, taken off its guard, as it were, finds perfection, although perfection is nowhere visible on earth. Such an emotional attitude of mind cannot last in the same degree of intensity. It may, in truth, sober down to a condition of real insight, with appreciation and lifelong affection, but that is an accident most fortunate for those involved. The emotion itself is blindness, and fortunate is he or she who, having experienced it, awakes to find that a prize has nevertheless been drawn in the lottery of life.

Putting this blindness or temporary madness out of question, different circumstances of birth and training, differences of disposition, different habits of thought, and many other things

relating to life, in themselves perfectly blameless, will often prevent the realization of extravagant hopes in marriage. Love may be at bottom true, but it cannot fail sometimes to be put to a severe, and sometimes intolerable test, by constant jars about trifles. These little things are, in fact, those which make life miserable. In the presence of great grief or calamity, the mind springs vigorously to meet the emergency. Even in prosperity, both men and women need all exercise of patience and forbearance to meet jointly, in complete unison, the petty annoyances of life. Unthrifty housekeeping, bad cooking, irregular meals, extravagance, will ruin the comfort and happiness of any household. Love may, indeed, survive diminished, but ever growing less and less amid the daily grind of petty cares, but at least sweet tranquility of domestic life has no part in such a household to soothe existence. It sometimes happens that there has been, through conventionality, but slight intimate acquaintance between the parties to marriage. If true love, however, really inspires each party to it, they become in time assimilated from due regard for one another's character.

Coleridge says:—

“All thoughts, all passions, all delights,
Whatever stirs this mortal frame,
All are but ministers of Love,
And feed his sacred flame.”

If this be not so, however, in any particular case, the entering wedge exists which may shatter all domestic happiness. Who can separate selfishness and unselfishness, to make them stand apart with well-defined boundaries? Everything outside of ourselves must appeal to our perception in one way or in another, as a certain thing or its opposite. Whatever does not appeal to us as right, is practically non-existent so far as we are personally concerned. In giving himself into the keeping of a wife, does not a man purpose the purest satisfaction for himself of which he is capable? Do not good women love self-sacrifice for their husband's sake? The sentiment of love, as now known

among civilized peoples, is a highly refined conception compared with that simpler, ruder one among savages, from which it has been, in the course of time, gradually evolved. Even among the most advanced nations of antiquity, woman occupied a very low plane compared with that upon which she now stands through the influence of Christianity. Woman, through its influence, came to be regarded, not as the mere plaything, but as the serious life-partner of man, the blessed spirit of home life.

It is from the mass of the people that generally spring those who either inaugurate or else lead great movements for the betterment of mankind. It is generally from the so-called ranks, that those rise who elevate the thoughts of their fellows and widen the boundaries of human knowledge. In this country, where no artificial distinction of rank is known, and where every one is more untrammeled than elsewhere, the artificer of his or her fortunes, every generation has produced fine men and good and beautiful women. Every separate, smaller community contains its thousands of simple, virtuous, and happy households. Do not be misled into thinking that the Smart Set represents, amidst the sterling worth of the country, more than the froth of wealth, idleness, and vanity of mind. Aristocracy, aped in their hands, would sometimes be known as slum-born, if it were poor. Yet a female writer has lately had the folly to represent it as leading the social van in America, when, in fact, it trails behind in most disreputable guise of vulgarest pretence.

“A simple maiden in her flower
Is worth a hundred coats-of-arms.

.
Trust me, Clara Vere de Vere,
From yon blue heavens above us bent
The gardener Adam and his wife
Smile at the claims of long descent,
Howe'er it be, it seems to me,
'Tis only noble to be good.
Kind hearts are more than coronets,
And simple faith than Norman blood.”

The admiration which the opposite sexes intuitively feel for each other is of a distinct kind. It is entirely different from that which men feel for men and women for women. Men esteem and honor, and like, but rarely love their fellows, unless relations. Women view each other with more critical eyes than those with which men regard each other. Women have more rivalry among themselves regarding men, than men have among themselves regarding women. Anyone who has ever been at a watering-place where women are expecting the advent of men in numbers with the season, men perfectly unknown to them, has seen their previous carelessness of attire and ways, and the sudden revolution that takes place in their appearance and manners, when the men appear, can testify to the fact which indicates a species of rivalry wholly unknown among men.

One of the most remarkable instances of the power which a lover's fancy has of imparting charms to homeliness is found in Dr. Johnson's relations to his wife. Of them Macaulay says that: "While leading this vagrant and miserable life, Johnson fell in love. The object of his passion was Mrs. Elizabeth Porter, a widow who had children as old as himself. To ordinary spectators, the lady appeared to be a short, fat, coarse woman, painted half an inch thick, dressed in gaudy colors, and fond of exhibiting provincial airs and graces which were not exactly those of the Queensberrys and Lepels. To Johnson, however, whose passions were strong, whose eyesight was too weak to distinguish cerise from natural bloom, and who had seldom or never been in the room with a woman of real fashion, his Titty, as he called her, was the most beautiful, graceful, and accomplished of her sex. That his admiration was unfeigned cannot be doubted, for she was as poor as himself. She accepted, with a readiness which did her little honor, the addresses of a suitor who might have been her son. The marriage, however, in spite of occasional wranglings, proved happier than might have been expected. The lover continued to be under the illusions of the wedding-day until the lady died in her sixty-fourth year.

On her monument he placed an inscription extolling the charms of her person and of her manners; and when, long after her decease, he had occasion to mention her, he exclaimed with a tenderness half ludicrous, half pathetic, ‘Pretty creature! ’ ”

Of the poet Burns it was once written: “When he selected anyone, out of the sovereignty of his good pleasure, to whom he should pay his particular attention, she was instantly invested with a sufficient stock of charms out of the plentiful stores of his own imagination; and there was often a great disparity between his fair captivator and her attributes.”

Dante thus describes his first sight of Beatrice, who was to be so intimately associated with his own intellectual and emotional elements of being:—

“Already, nine times after my birth, the heaven of light had returned, as it were, to the same point, when there appeared to my eyes the glorious lady of my mind, who was by many called Beatrice, who knew not what to call her. She had already been so long in this life, that in its time the starry heaven had moved towards the east the twelfth part of a degree, so that she appeared to me about the beginning of her ninth year, and I saw her about the end of my ninth year. Her dress on that day was of a most noble color, a subdued and goodly crimson, girdled and adorned in such sort as best suited with her tender age. At that moment I saw most truly that the spirit of life which hath its dwelling in the secretest chamber of the heart began to tremble so violently that the least pulses of my body shook therewith; and, in trembling, it said these words, *ecce deus fortior me, qui veniens, dominabitur mihi*” (behold a god, stronger than I, who will rule me).

Petrarch enriched literature by his sonnets to an idealized woman, Laura. Referring to those effusions, Mr. J. Addington Symonds remarks, that Laura “was not so much a woman as woman in the abstract; and, perhaps, on this very account, the poems written for her by her lover have never been taken to the heart by countless lovers who came after him (Petrarch). The

method of his art is so generalizing, while his feeling is so natural, that every man can see himself reflected in the singer, and his mistress shadowed forth in Laura." What noble loves are these idealized ones of Dante and Petrarch, compared with those of sensual men who would despoil woman of her greatest worth and grace in purity, without which the rest is dross.

Having now touched at sufficient length upon Expression and all that is mentally and morally connected with it, it behooves us to enter upon some considerations concerning the union of the opposite sexes from an entirely medical point of view, as intimately connected with health and general well-being.

There are certain prevalent diseases, often destructive of mind as well as of body, which are markedly hereditary in character; and which it is extremely unfortunate should be perpetuated in offspring. These are syphilis, scrofula, consumption, epilepsy, and insanity. Although consumption is not hereditable directly, that is, hereditable as a disease, it is hereditable indirectly, through the fact that its physical concomitants of weak chest, narrow shoulders, low vitality, and other conditions, signify that their possessors become an easier prey than other persons to the disease. A person may, in a word, not have the disease in even an incipient form, but may have what physicians call a consumptive diathesis or predisposition from nature to acquire it.

It is hardly to be expected that the ardor of youth contemplating marriage will study the medical history of the families represented by the scions who desire to join their fortunes in life. At the same time it is not too much to expect that they would take at least a cursory view of the situation before leaping into the dark. Not their progeny alone is sometimes involved in the situation. It has happened that they themselves have been parted soon after marriage by the disease, insanity, which they would have had every reason to believe, upon investigation, should and would have forbidden the banns.

There is warrant for calling the attention of parents and

young people to this important subject. Those of inferior physique, in whose families consumption has been rife, should beware of marriage. Most children who inherit a tendency to consumption and scrofula are doomed to physical and mental suffering. They may be able to do little or nothing for their own support, the victims of spinal disease, lameness, glandular affection, unsightly scars. The fate of such children is sad, even if their parents are in easy circumstances and able to afford them every alleviation. As, however, it is among the poorer classes that these diseases are most common, the condition of those among whom they occur is most pitiable.

It would be best for the health and vigor of any race or nation if self-denial in marriage were to be practiced by members of families in which serious nervous disorders, epilepsy, insanity, or idiocy have occurred. These diseases are strongly hereditary, appearing and disappearing in successive generations. The radical imperfection of nervous organizations, which is the cause of these serious disorders, may manifest itself in different forms in successive generations. Among the poorer and uneducated classes this radical imperfection is often associated with morbid impulses to drunkenness and crime. Melancholy it is to every close observer among medical men, to witness the transmission of evil traits of mind and body to progeny. The abuse of alcohol is frequent in families that have an hereditary taint in the direction of stimulation of the nervous system. St. Vitus's dance, hysteria, paralysis, imbecility, are found in the same class of subjects. Intemperance is, in many cases, owing to the instability of the nervous tissue of the body. Weak will-power is characteristic of weak people, and naturally, anything can become of one of these who has the predisposition to indulgence through promptings of the mind, and little or no power to resist them. Between, on the one hand, a faulty nervous system, inherited tendency to drink, and deficiency of will power, and on the other, the obligations of the duty of life, a person is really between the devil and the deep sea. Excess aggravates the spe-

cific nervous disorder and strengthens the tendency of such persons to transmit evil constitutions to their children. An imperfect nervous organization, poverty, ignorance, perpetuate the criminal class. The effect of depressed vitality alone was well exemplified on a large scale during the siege of Paris, in 1870, in the Franco-Prussian war. The consequent famine brought into existence in Paris a stunted population which came to be known as "children of the siege." These miserable creatures came into the world physically, mentally, and morally defective. The population, too, known up to that time as one of the most temperate in the world, became addicted to inordinate stimulation from the drink called absinthe, the direct consequence of general disorder of the nervous system, brought about by the exertion, hunger, anxiety of days and nights passed in strenuous defense of the city from the surrounding German hosts.

CHAPTER VIII.

HOW TO CULTIVATE AND PRESERVE A GOOD COMPLEXION.

TWO important elements of comeliness, if not of positive beauty, are somewhat under our command. These are the complexion and the expression of the face. Of the expression enough has been said in the preceding chapter. The conditions upon which, from nature, a good complexion depends, have also been previously described. It remains, therefore, only to mention briefly how it may be preserved.

The skin is, as has already been pointed out, much more than a mere protective envelope for the parts beneath it. It does, in fact, besides being a highly protective organ, serve a greater variety of purposes than any other portion of the body. When the complicated offices of the skin are perfectly performed, it is in the best possible condition of healthiness. A skin well nourished by blood must be at least a healthy skin, and so far as its physical structure admits, at least a slightly one. It stands to reason, that the personal habits which promote the nutrition of other organs, favor also the good condition of the skin. All parts of the body, being indissolubly bound together, when any one part suffers, the health of others is impaired. The skin is peculiarly susceptible to influence from the internal parts of the body. It is also necessarily liable to injury from external causes. It must, therefore, be frequently and thoroughly cleansed, for ablution has a beneficial effect, not only upon the skin itself, but upon every other portion of the body. Wholesome blood is attainable only by temperance in all things, temperance in eating and drinking, rational exercise of mind and body, judicious clothing, ventilation, with avoidance of draughts, resolute abstention from petty worrying. The condition of the blood and that of the nervous system are the chief factors producing a good complexion.

The skin is in some persons of a more delicate texture than it is in the case of others, the scarf-skin is softer and

smoother. An inborn inferiority in the texture of the skin cannot, of course, be overcome; it can only be modified. The amount of coloring matter in it cannot, by artificial means, be either increased or diminished. We are able, however, to prevent, by protecting the face from undue exposure to the sun, an increased deposition of pigment, which nature throws out, with oily matters, in protecting the skin from excessive heat. The health and beauty of the skin depend primarily upon the general constitution of the body. Strict obedience to the laws of hygiene, which have just been detailed under the counsel of temperance, is the indispensable requisite for the production of a pure and pleasing appearance of the complexion. Those largely constitute, independent of regularity of features, personal beauty.

There is a close connection among the conditions of health, virtue, and beauty. Healthy people enjoy the great blessing of steady nerves. They are, in consequence, able to bear, as petty, what are great annoyances to persons otherwise constituted. They are thus better able than others to control sudden impulses. Composure of spirit is expressed in their faces. On the contrary, those who, from whatsoever cause, suffer from a low condition of the nervous system, ail, not only in body but in mind. A discontented, often peevish expression, is stamped upon their faces. The complexion inevitably suffers; if they once had a healthy one, it is succeeded by sallowness. The eyes become surrounded by dark circles, and the habitual action of certain muscles of the face develops premature lines and wrinkles.

A rational system of bodily education, from the earliest years of life, fortifies the general system, and in many cases prevents the development of predisposition from congenital causes. Thus, when any person has, early in life, an unwholesome, muddy complexion, or an eruption upon the skin, it becomes advisable for a physician to examine minutely into the condition of all the organs of the body. Should he be employed, he inquires closely into the past and present habits of the patient, and in addition to purely medicinal treatment, outlines with great care a regimen of diet, exercise, bathing, and recreation.

CHAPTER IX.

THE BATH.

THE cosmetic—that is, the beautifying—and the hygienic—that is, the health-giving—effects of cleanliness are closely allied. If the watery and oily liquids which are secreted and excreted by the glands of the skin are allowed to accumulate upon its surface, they soon undergo decomposition. Evaporation of the perspiration is retarded. These liquids, therefore, need removal, especially in summer, by means of pure soap and water. If allowed to remain upon the surface of the body, these cutaneous secretions create in the course of time an obstruction to the escape of similarly formed matter and also emit, under the influence of heat, most unpleasant odor. From the interior of the body comes this waste; but, additionally, from the exterior, the body receives foreign matter, called dirt, which should be constantly washed away in the interest of health and of decent observance of social propriety. A dirty skin is not only unsightly, but it is unhealthy to the owner, and offensive to the sense of smell.

Among the substances deposited on the skin are the microscopic organisms called microbes, the fertile source of specific diseases. Scientific studies of the last twenty-five years have proved that very many of the disorders to which humanity is subject, proceed from the growth of these germs. Most of them belong to a low class of vegetable life, called *fungi*, and are parasitic in their nature. A skin that is seldom bathed affords them the best possible field for growth. As they multiply, and they do so with exceeding rapidity, they insinuate themselves into the glands, and may even obtain entrance to the blood-vessels.

It is obvious that the skin must be peculiarly liable to invasion by these parasitic organisms. Like seed, they cannot

germinate except in favorable soil. An unclean body affords them the best, a clean one none at all. If the skin be kept perfectly pure by frequent ablution, and is abundantly supplied with rich blood, it is fortified against the encroachment of bacteria. If, on the contrary, cleanliness be neglected, the skin, as already said, affords the most favorable conditions for their reception and growth. It has been discovered by most elaborate experiments and observations, that these minute organisms effect disturbance, not only by their presence and infinite numbers, but also by their yielding a by-product of a poisonous sort, known as *ptomaine*. Doubtless every reader of these lines has read of fatal cases of *ptomaine* poisoning. Those relate to large amounts of *ptomaine* taken into the stomach. But the same poison, in lesser degree, has instant action upon the skin where pathological bacteria, as they are called, disease-creating bacteria, are present there, and they give rise to white pimples, abscesses, boils, carbuncles, erysipelas, and other affections of the skin. Choked glands always have a tendency to disease. An unclean skin is exposed to morbific influences from within and without. Through bathing, the germs are removed, the surface is freed from accumulations of all sorts, the glands of the skin are enabled to perform their functions perfectly, and there is but little danger of attack by those affections which are so destructive of the skin and indirectly injurious to the body.

A crust composed of pellicles of scarf-skin (called, on the head, dandruff, but falling everywhere from the body) mingled with secretions and foreign impurities, embarrasses that portion of respiration which the skin performs. This respiration, relatively small as it is, is still worthy of consideration on account of the part that it plays in conveying oxygen to the blood and removing from it carbonic acid. Furthermore, by virtue of the intimate sympathy among all parts of the body, ablution excites a real influence over it in its entirety. A layer of foreign matter, whencesoever derived, acts as a mechanical and chemical irritant; through the effect of which substances which should find their

natural outlet through the skin burden the lungs and kidneys to their great detriment.

Apart from the agency derived from its mere chemical nature, water produces different effects according to its temperature, the manner of its application, and the constitution of the individual. At a temperature from seventy-five to eighty-five, Fahrenheit, water has no specific effect upon the human system, either as a stimulant or a depressant. When the temperature is raised to one hundred, the first effect experienced is stimulant; but if the application be much prolonged, the effect becomes profoundly depressant. The impression produced by warm water on the nerves of the skin causes dilatation of the cutaneous blood-vessels, and therefore an increased flow of blood to the surface of the body. Then radiation of heat from the distended vessels (if the surrounding atmosphere, upon getting out of the bath, be lower), produces a reduction of the temperature of the body.

On the contrary, speaking of a cold bath, its first effect is the contraction of the surface blood-vessels, and the consequent repelling of heat from the surface of the body to its interior. Subsequently, when getting out of such a bath, occurs, in the case of the healthy and robust, not in those of the opposite condition, what is called reaction. The blood which had been repelled from the surface rapidly returns to it, and a pleasant sensation of warmth and exhilaration is experienced. With this sensation are immediately combined increased respiration and general circulation and the nutritive, glandular, and muscular organs receive stimulus. It follows, from what has been said, that the distinctively cold bath is adapted only to the robust. The weakly are depressed by it; they have no reaction, they emerge from it shivering, with livid lips.

The benefits of the cold bath are obtained in the highest degree in the ocean's surf. A number of circumstances generally contribute to this: the stimulation of the skin, owing to the chemical constitution of sea-water; the impact of the waves

upon the person of the bather; the freedom of movement in exercise; and, generally, chosen companionship. Besides these, is the influence of brightness, sea-air, and the view of the ocean's expanse. To derive perfect benefit from this kind of bathing, however, the water should be left before the stage of immersion has been reached when the possibility of reaction of the system from cold has passed away. Even to some persons of tolerable health, but delicate physique, reaction is tardy in taking place, or wholly absent, and to these ocean-bathing is never advantageous.

Struck by the combination of the apparently rude health and the bedaubed skins of some of the children reared in squalid portions of large cities, people have sometimes asked what detriment from dirt these children have suffered. Their immunity is not so real as it may seem. In so far as it exists it is attributable solely to the influence of the relatively out-door life of these children as compared with that of many other children. But be not deceived by casual observation of such children. It is the select few who are really lusty as children. Others near by are bedridden, in small, ill-ventilated and dirty rooms, suffering from hip-disease, abscesses, affections of the bones, what not; the consequences of unhealthy surroundings, innutritive or insufficient food, and general unhygienic modes of life. The lusty children seen upon the streets have many sick brothers and sisters; and some of those now upon the streets are liable in time to encounter their temporary or permanent fate. These are the kind of children upon whom scrofula often sets its disfiguring marks. Scrofula runs riot in the dirty, narrow alleys of large cities. Yet its outbreaks may often be prevented, and are always mitigated, by ventilation, food, exercise, and cleanliness.

A very striking illustration of the consequences of insufficient food and anxiety was afforded by the physical condition of children born in Paris during its siege by the Germans in the Franco-Prussian war. Mention has been made in a previous chapter of the stunted generation of Paris following the siege,

called "the children of the siege;" but this now relates to the diseases to which they were heirs at birth. Monsieur Legrand du Saulle published the results of his observation of ninety-two children born during the siege. Of this number, sixty-four were deficient, either in mind or body. He divides these sixty-four into three groups. In the first, numbering thirty-five, he found children with retreating foreheads, scrofula, strabismus (cross-eyes), club-foot, incontinence of urine, and rachitis (rickets). In the second group, numbering twenty-one, were presented moroseness, apathy, inability to fix the attention, semi-imbecility, and idiocy. In the third group, numbering eight, were observed wilfulness, viciousness, quarrelsomeness, and egotistical qualities.

Baths are called general or partial, according as the whole body, or only a portion of it, is immersed. The general bath may be taken in a tub, or if, for any reason, this method is not practicable, by what is called the sponge-bath, because the whole body is bathed with a wetted sponge. In any case, the water itself should be regulated in temperature according to the season of the year, the physical condition of the bather, and the object for which the bath is taken. For purposes of cleanliness, the bather being in good health, the water should be tepid. In winter, the bath may be taken somewhat warmer than in spring or autumn, and in summer may be advantageously taken cold. For those to whom the shock of entering cold water is unpleasant, it is a good plan to fill the bath-tub with lukewarm water, and when the body is immersed in that, gradually to lower the temperature by the cold water faucet, until the water becomes of the degree of coolness indicated by experience for comfort. In summer it is very refreshing, and also conducive to sleep, to take a cool bath just before going to bed. In winter, a slightly warmer bath just before retiring, is conducive to sleep. Warm baths are soothing to the nervous system; so much so, that children taken squalling with colic out of bed and plunged therein are often instantly relieved of pain by the process.

There may be some slight danger among extremely delicate persons in taking general baths in winter, unless they adopt the following simple precautions, which, knowing, they would be foolish not to adopt. Bathe in tepid water, dry the skin thoroughly with towels, take a little calisthenic exercise to promote circulation, pass from the bath, if through cooler atmosphere than that of its room, protected by a morning-gown, or by something thrown around the shoulders; and then, before venturing into the cold street, wait for the acquisition by the body of about the same surrounding temperature as that before the bath was taken. These remarks apply, of course, only to the bathing of persons of an extremely feeble habit of body.

There is no recommendation here of bathing in ice-cold water. The writer well remembers the braggadocio of a young man who plumed himself upon breaking a skim of ice preparatory to taking his daily morning bath. He proved to be constitutionally a very weak young man, whose early death must have been hastened by his imprudence. The sensations of the bather are a much safer test than the thermometer, of the temperature at which a bath should be taken. It should never be forgotten, however, that when the constitution is good, its resistant power is increased. Its reaction is evidence of the fact that it is invigorated by the administration of moderately cold water: that is, by what we call cool water.

Shower-baths and douches are sometimes very beneficial to the system. They arouse reaction by the force with which the water strikes against the skin. The douche is best applied by means of a rubber hose attached to a faucet, terminating in a broad nozzle. By it, a heavy stream can be directed against any part of the body. Some nozzles are so constructed as to change the jet from a single stream to a spray; and, again, there are manufactured nozzles of different calibers. The influence of the douche is to increase the depth of breathing, strengthening the action of the heart, and augmentation of the secretions.

There are many persons, especially in large cities, who,

although they may not be looked upon by themselves or by others as distinctively invalids, are nevertheless, in a very low condition of health. They go about, transact business, take part in social affairs, but at considerable stress upon their small vitality. Too often their persistence in enforced activities proves the forerunner, the entering wedge, of their collapse. Slight functional derangements gradually become converted into severe organic and irremediable maladies. Much can be accomplished even in such cases, by strict regulation of habits, the observance of perfectly hygienic modes of life. They should be instructed as to the best mode to pursue for securing all the strength and elasticity of body of which their constitutions are capable. The employment of water, for example, is most desirable in the treatment of disease. When circumstances do not admit of total immersion of the body, an advantageous procedure is found in the application to it of the wet sponge. The sponge is pressed upon and rubbed along the body and the little streams trickling from it produce a most grateful sensation. Benefit from the sponge-bath is increased by sitting or standing in the hip-bath tub or in the ordinary bath-tub. After the body has been liberally flooded with water, the lather of soap can be pleasantly applied and finally washed away with plain water. An incidental advantage of the sponge-bath for delicate persons is that it may be applied upon different parts without exposing the whole body at the same time.

When the general bath is used, and, above all, the shower-bath, women should protect their hair from wet by an oil-skin cap. After bathing they should thoroughly dry the skin with a rough towel, and stimulate it by the use of the flesh-brush. It is not, however, desirable to employ towels so harsh as to rasp the skin, or flesh-brushes that are exceedingly stiff in their bristles. A huckaback or a Turkish towel makes a very good appliance for the bathroom. The good effect of the bath upon the secretions and circulation of the skin, its nerves and respiratory function, and the general nutrition of the body is attested by the

pleasurable sensation accompanying and following its administration.

By reason of the exercise and other features of sea-bathing, already enumerated, prolonged enjoyment of it may eventuate in a frame fatigued, chilled, and weakened. While it is admitted that sea-baths are highly beneficial if taken with prudence, that they promote appetite, digestion, and general health, it must also be confessed that they are generally abused. It is too much the practice of persons to remain in the water long after the stage of possible reaction has passed. The skin has become cold and shrunken; that is easily seen on the finger-tips, and the lips have become either pale or livid. It is only with reasonable self-control that surf-bathing is advantageous, and then only to those who are either without any actual disease, or who have not been debilitated by long, continuous labor of some sort. Violent diarrhoeas have been known to occur from long and repeated immersions in sea-water. Cases have been known where women went into the ocean three times in a single day. Sea-bathing is, nevertheless, beneficial, if judiciously employed, even in the cases of persons who have recently risen from an exhaustive illness, and consumptives are often invigorated by it. The persons who are most improved or relieved by it are those whose disease is either quite stationary, or, at least, seems to make little progress. When lungs, however, are actually undergoing degeneration, as evidenced by cough and expectoration, afternoon fever, and night-sweats, surf-bathing is most scrupulously to be avoided.

Persons should not bathe in tubs, river, or sea, while the act of digestion after a meal is going on. It is best to allow an hour, better, three hours, after eating, before entering the water. Without this precaution the digestion is seriously disturbed. The fashionable hour at the seaside, unless on shores where low-water makes that time impracticable, is eleven o'clock in the morning. It is an hour which well accords with what is prescribed by physiology; the stomach, by that time after the

usual hour of breakfast, having mainly digested and absorbed its food and being comparatively empty.

As mankind must have had its rise in tropical, semi-tropical, or, at least, in warm climates, the cosmetic and the hygienic advantages of bathing must have been early discovered by the human race. Savage tribes, although not always punctilious regarding cleanliness, generally recognize the tonic and pleasurable effects of bathing in moving water. An observer, of some forty odd years ago, saw that some of the Indian women of the Northwest Pacific Coast daily retired to sequestered spots on the shore, and there bathed. He also observed that they then put on again their soiled and greasy garments; but, poor creatures, that is not to be set down to their discredit, for they had no other clothes than those which they were wearing. So it has been with many other savages. The people of the Hawaiian Islands have been known, from the earliest time at which their acquaintance as pure savages was made, to be extraordinarily addicted to bathing and swimming. It surely is greatly preferable to put on dirty clothes over sweet skins, than to cover dirty skins with fine clothes, as is well known to physicians to be a condition not infrequent in the midst of the highest civilization.

Savages who dwell near the margins of rivers and the sea-coast become expert swimmers. The proximity of alligators, crocodiles, hippopotami, and sharks does not always deter them from entering the water. They even become so familiar with the element in such places, and with the habits of the dangerous creatures that frequent it, that they therein wage war with them with nearly as much confidence as with the ferocious animals that inhabit the land. The Polynesian Islanders, men, women, and children, almost live in the ocean, tireless in swimming, and take the greatest delight in tossing through a heavy surf.

Civilized people always did, but do so now more than ever, recognize the value of water as serving the purposes of cleanliness and health. The laws of Moses mention conditions in which bathing shall be performed as a religious rite, associated with

moral purification. The influence of constant bathing in protecting the ancient Jews from prevalent diseases of the skin must have been great. It was the custom in Palestine for the wealthier classes there to have private bathrooms in their homes. Public bath-houses were furnished to the poor. Other races of antiquity associated personal bodily purity with moral purification. Bathing was a consecrated ceremonial, as well as a mode of securing personal cleanliness, practiced among the Egyptians. Mention is made of the bath in their earliest written records. In the Biblical account of the discovery of the infant, Moses, in the bullrushes, we read that "the daughter of Pharaoh came down to wash herself in the river." Ancient East Indian literature refers to bathing in the river Ganges as a common practice. The Greeks were early addicted to bathing and swimming. References to the practice are found in Homer. The houses of the wealthier Athenians, in later times, were furnished with bath-rooms, and subsequently public baths were established. The immoderate use of the warm bath was regarded by the Greeks as a sign of effeminacy. The great luxury of the baths of Persia excited the admiration of Alexander the Great when he invaded that empire.

The elaborate development of the bath, at the time of Rome under the Empire, can never be surpassed. In the early days of the Roman Republic, bathing in the river Tiber was the usual practice among Rome's citizens. Shakespeare, it will be remembered, represents Cæsar as swimming across the Tiber, and, failing in strength, calling upon Cassius to save him from drowning. When the city of Rome had greatly extended its bounds, and great quantities of water were brought into it by the immense aqueducts constructed, and then distributed through pipes, private and public bathing apartments were built. At first cold water was exclusively used, but as the people gradually lost their hardiness, luxury grew, and the warm bath became popular. Magnificent bathing establishments were erected, not only in Rome, but in the principal cities of the Roman provinces. The

public baths became resorts for people assembled, not only for the purpose of bathing, but for that of social intercourse and political discussion. Some of the structures were of immense size, and within their enclosure were sometimes gardens, rows of trees, lounging and reading-rooms, theatres, spaces for games, etc., and admission to their palatial establishment was charged for at very low prices. At times, an Emperor, in order to ingratiate himself with the populace, would make the bath free to all without cost. Immense amounts were lavished on their establishments, which contained not only swimming and warm water baths, but hot air and vapor baths. There were dressing-rooms from which the bathers passed successively into a cool apartment, thence into a moderately heated one, and finally into the hot room situated immediately over the furnaces. These contained both water and vapor baths.

An ingenious and effective system was in use in the Roman baths by which water was heated and the temperature of separate rooms regulated with precision. The body of the intending bather was anointed before entering the water, and the transition from hot to cold rooms was arranged so as to be scarcely perceptible to the feeling. The rooms were furnished with seats at different elevations, and it was customary, for the sake of exercise, to engage in various games, especially that of ball, in passing from the dressing-room to the bathing-room. Whenever hot natural springs were found within their territories, the Romans were accustomed to utilize them and thus save the expense of heating bathing-water. Besides these great public baths in the cities, were smaller ones where private bathing-rooms could be hired. And then, as already mentioned, there were the strictly private bath-rooms in the homes of citizens of Rome.

Gibbon, the historian, gives the following brief description of the bath-houses of ancient Rome: "The stupendous aqueducts, so justly celebrated by Augustus himself, replenished the Thermæ, or baths, which had been constructed in every part

of the city with imperial magnificence. The baths of Antonius Caracalla, which were open at stated hours for the indiscriminate service of the senators and the people, contained about sixteen hundred seats of marble; and more than three thousand were reckoned in the baths of Diocletian. The walls of the lofty apartments were covered with curious mosaics, that imitated the art of the pencil in the elegance of the design and the variety of colors. The Egyptian granite was beautifully encrusted with the precious green marble of Numidia; the perpetual stream of hot water was poured into the capacious basins through so many wide mouths of bright and massy silver; and the meanest Roman could purchase, with a small copper coin, the daily enjoyment of a scene of pomp and luxury which might excite the envy of the Kings of Asia."

So enormous was the size of these edifices that the enclosing walls of the baths of Caracalla made an area of about a sixteenth of a mile square; that is, of about a quarter of a mile long on each side. A single room became there converted, in Christian times, into a large church. A Latin writer of the fourth century speaks, in describing the visit of the Byzantine Emperor to Rome, of "the spacious baths spreading around like provinces."

After the fall of Roman power, these immense bath establishments could no longer be financially maintained. On account of the abuses with which they were often connected, they were discountenanced by the early Christians, who practiced ablution, not for pleasure, but solely for the sake of cleanliness and health. Baths were, however, continued at Alexandria and other large cities.

Scrupulous cleanliness being enjoined by Mahomet, Arabs and Turks adopted the bathing practices which were prevalent in Egypt. The transitions of the Turkish bath from warm to hot apartments, in copious perspiration, cold affusions, and massage, are familiar to most readers. This species of bathing was introduced into mediæval Europe by the Crusaders, after expe-

rience of Eastern customs when seeking to recover the Holy Sepulchre. The Russian bath is of well-defined character. The undressed bather is escorted into a room surrounded by a wooden platform that rises in steps nearly to the ceiling. He lies down upon one of the lower degrees just made, and gradually ascends to the higher and hotter ones; the heat of the room becoming, of course, greater and greater towards the ceiling. Vapor for the apartment is produced by throwing water upon glowing hot stones. The temperature is between one hundred and forty and one hundred and forty-five degrees, Fahrenheit. At the first of its administration, a slight sensation of suffocation may be experienced; but, if so, it soon passes away with the flow of profuse perspiration. A much simpler and more agreeable mode of the administration of the Russian bath the writer once saw in San Francisco, California. The greatest objection to a common apartment for all bathers, indiscriminately, is that they are enveloped in the same cloud of vapor, which must, therefore, hold microscopical particles from the skin exposed to it, which particles must, therefore, be taken in with the breath of the bathers. It is not an agreeable idea to have so promiscuous a bath, even if it be not, in the feature mentioned, deleterious. But apart from the question, supposing the hot vapor to be perfectly pure, it is neither agreeable to breathe it, nor is breathing it conducive to more efficacy in the vapor bath. The appliance in San Francisco was simply a roomy box which opened with folding doors up to the height of about four feet, whence it slanted off towards the apex. The bather stepped inside, after the folding doors were opened, and took his seat on a bench at the back of the box; the doors were then closed, a wooden covering applied to the slant of the box above them, and finally, at the apex, two light boards, each reamed out to a half circle at its end, were slid in position to enclose his neck, between the edges of which and the neck a towel was neatly tucked. So the bather sat, secure from the fumes of vapor, whether plain or medicated, with his head out in the pleasant atmosphere of the

room, while his right hand controlled the stop-cock for vapor, which he could administer to any degree of heat that suited the fancy. This, followed by massage, and a most soothing nap under a blanket in a cool spot, made such an enjoyment as would be fit for the gods.

Both the Turkish and the Russian baths (the Turkish one not being vaporous) are valuable, not only as a means of cleanliness, but on account of the luxurious sensations by which they are followed. Discreetly used, they are conducive to health, and, indeed, have the power to put a sudden stop to some forms of illness. They are, however, inappropriate and even dangerous to persons with weak hearts, or with tendency of blood to the head. In the former, they may cause collapse, and in the latter, apoplexy. There is another qualification, too, regarding their use, mention of which should not be omitted. They raise the temperature of the cuticle to so high a point, and leave it so acutely sensitive, that the bather cannot, without a long period of gradually cooling off, after indulging in either of them, go into the winter air without incurring the greatest risk. The benefit of the vapor bath was discovered even by the savage Indians of North America. They built air-tight ovens close to the margin of a stream, filled it with vapor from water thrown on red-hot stones; and when they were in the most profuse perspiration, threw themselves into the river and vigorously swam. Had they not exercised violently, their baths would have done them more harm than good, would perhaps have been fatal.

The Japanese are fonder of bathing than are any people of modern times of whom we know. They are much addicted to the use of hot baths. To this practice of theirs some writers ascribe their remarkable immunity from rheumatism. But this is not a legitimate conclusion. Hot baths do sometimes relieve the pains of chronic rheumatism, but climate and idiosyncrasy of the individual have more to do than any practice in bathing with susceptibility to rheumatism. There are other diseases from which the Japanese and other Asiatics are notably free.

Scarlet fever is unknown among the natives of Japan and Hindostan.

Cold water is much less efficient than warm water for securing cleanliness. It is, however, more tonic than warm water, and, with facilities for bathing of the modern sort, warm water can be used for its cleansing and cold water, following it, for its tonic quality. The film, of which we have previously spoken here as tending to form on the body, consisting of a mixture of pellicles of dead scarf-skin and fatty matter and various deposits from within and without, composed of organic and inorganic substances, cannot all be dissolved by cold water. But some substances do not readily dissolve even in warm water. Therefore, for a perfectly cleansing bath is needed a substance capable of making a solution of any foreign substances, especially oily matters, present on the skin. This substance is a properly prepared, pure soap.

Soap is a combination of fatty substance with alkali, such as soda, and, as such, is soluble in water. In addition to its removing dirt, the friction accompanying its application stimulates the circulation and tone of the skin. The water used should not be very hot nor the soap be too frequently nor lavishly used. Good soap should be of neutral reaction; that is, it should contain but little free alkali—alkali combined with fat. An exact combination of fat and alkali, by chemical skill, produces a soap of neutral reaction, or, in other words, a soap that is neither distinctively acid nor alkaline. The precise result is, however, seldom or never attained in the manufacture of a soap. We must try, in choosing a soap, to obtain the nearest approach to it. The presence in soap of an excessive amount of alkali acts upon the skin as an irritant, and may even produce on it a caustic effect. Less alkali may still be injurious in the same way, but in lesser degree, by dissolving the fat of the scarf-skin, leaving it dry, harsh, and easily disposed to crack. Many soaps sold for toilet use are attractive to sight and smell, but are no more fit to be used upon the skin than is laundry soap. The essential

oils often used to give an agreeable perfume to toilet soap, are often irritant to the skin. The same remark may frequently be applied to the pigments which afford the brilliant colors employed in soaps to attract the eye of purchasers. Cocoanut-oil soap is undesirable for the toilet on account of its requiring a large amount of alkali to saponify the oil. The finished product retains a surplusage of lye, besides other irritants, and the oil itself is extremely liable to decomposition. The single advantage that cocoanut-oil soap has over other soaps is that it dissolves in salt water, and therefore may, on occasions, be more useful than any other at sea. Hence it is often called the marine soap.

Many soaps that are sold for the toilet contain injurious adulterations which seriously diminish their usefulness. Resin is one of their commonest impurities, being introduced in soaps because it has the effect of saponifying fat with the minimum expenditure of soda. The presence in soap of a considerable amount of resin is decidedly irritant to a delicate skin. Other substances often added to soap are pearl-ash, silicate of soda, starch, sugar, and an excess of common salt. These ingredients are either harmful in themselves, or are transformed by combination with soda-lye into deleterious substances. So-called transparent glycerin soaps are frequently made without a particle of glycerin, their transparency being produced by the introduction of sugar in them, of which article they may contain even a larger quantity than of soapy material. Such adulterations are useless for cleansing purposes and may be positively injurious to the skin.

A number of oleaginous and demulcent, or even slightly stimulant substances may make very acceptable additions to soap intended for toilet use. These, equally distributed through the mass, and mingling with the lather, produce both a softening and tonic effect as distinguished from the detergent, the cleansing action of the soap. Lanolin, for instance, is a peculiar kind of fat obtained from sheep's wool. It possesses the admirable

property among fats of being less liable than they to decomposition. For softening the skin, it may be used either in the form of composition with a soap, or as what is called "lanolin-milk." Lanolin-milk is prepared by mixing seventy-five grains of lanolin with about a fluidounce of water, gently heating the mixture, and adding to it sixty grains of neutral soap dissolved in a fluidounce of water. The whole is then thoroughly mixed, enough warm water added to it to make about twelve fluidounces, and the mass thoroughly shaken in a bottle. Pure lanolin is white and has scarcely any odor. When added to soap, it neutralizes any solvent or irritant action due to the presence in it of too much alkali. A pure glycerin soap is an excellent preparation for the skin, especially in the winter, when the hands have a tendency to become chapped. It should contain, if properly made, equal quantities of pure, hard soap and glycerin. An excess of glycerin dissolves the soap and produces in it a feeble lather. Some good soaps contain bran, oatmeal, marshmallow, and pine-needle extract. In concluding the subject, it is advisable to remark, that although soap is useful for the removal of bodily impurities, an excessive use of it is objectionable, and that it may even cause tetter. Water is capable, when combined with certain substances, of exciting the skin to eczema.

Inactivity or torpidity of the liver is a very common affection, and manifests itself in a sallow complexion, impairment of appetite and digestion, depression of spirits, and sometimes in eruptions and itching of the skin. The concomitant, sluggish circulation of the blood through the liver is stimulated by bathing, through its attraction of blood to the surface of the body. When blood flows more actively through the liver, its cells become more plentifully supplied with their needed food of oxygen, and beginning to resume more effectively their retarded labors, digestion and general nutrition of the body are improved. Bathing, under proper regulations, is beneficial in anaemia, obesity, chronic rheumatism, neuralgia, St. Vitus's dance, and other nervous maladies. The systematic employment

of water in various diseases has of late years engaged the careful attention of physicians, and it has been found of great service in a number of constitutional disorders, acute and chronic. These cases, however, demand the attendance of a medical man; the administration of bathing for them should be entirely by his prescription.

Diseases of the skin fall within the category of those deviations from health which, ordinarily, do not prevent attention to business. But they often expose the sufferer to an amount of mortification out of proportion to their real severity, and this is particularly so in the cases of young women. Many of these cases are chronic in their nature. Pimples, known as *acne* to the medical profession, can be treated advantageously by the application to the skin of water as hot as it can be borne. The treatment is particularly useful in the most inveterate form of the disease, where the pimples are large, hard, and of a dark red color.

Hot water baths are valuable when the perspiratory function is deranged. There are cases in which the perspiration is more or less suppressed, which affection may involve only a part; or, again, the whole surface is affected, feels dry and rough to the touch, and itches and burns. This affection is medically known as *anidrosis*. It is generally caused by some impairment of the health, and is, therefore, simply one of the symptoms of constitutional impairment from some underlying malady. Its treatment should therefore be made to depend upon assignment of its particular cause, and that no one but a physician is competent to assign. The use of hot water baths has, however, a beneficial effect in its treatment, inasmuch as they have good influence in restoring the glands to their suspended functions.

There is an opposite physical condition to the one just described, and yet for which the same treatment is applicable. This is known medically as *hyperdrosis*, or excessive perspiration. It, too, may occur only on certain portions of the body, or it may involve the whole surface. It is a disorder very apt

to attack the face, hands, and feet. Sometimes abundant perspiration will break out upon one side of the face, the other side remaining perfectly dry. The palms of the hands may persist in being moist, however carefully dried. They become white and wrinkled, cold and clammy to the touch. The hot bath and the hot douche are beneficial when the nerves of the skin are in the unhealthy condition indicated by these symptoms.

Neuralgia of the skin may occasion mere tenderness or great pain. It may be so severe, that the slightest touch of the clothing can scarcely be borne. Itching of the skin is not infrequently so constant and violent as to produce great distress. It may be caused by various derangements of the nervous system, and by any bad habit which saps vitality. It may also result from rheumatism, gout, emotional shock, or from disease of any of the principal organs of the body, and is common in extreme old age. It is unaccompanied by any observable alteration in the skin except that produced by the inevitable scratching for relief. All of the diseases and symptoms named may be relieved or cured by the application of water at various temperatures to the skin. A number of cutaneous affections are characterized by the formation of pustules on the skin. These vary considerably in size, and, eventually rupturing, form crusts. Inflammatory sensation from them is alleviated, the fall of the crusts hastened, and healing promoted by the use of warm baths. In many forms of tetter, and even in more severe forms of skin-diseases, the same treatment is beneficial.

When a person in whose case a Russian bath is prescribed, is unable to leave home to go to a public bath-house, a domestic substitute for its application can easily be extemporized. Let the patient be stripped and placed upon a cane-seated chair, and covered from head to foot with blankets from the neck downward. A spirit-lamp, above which rests a can of water, is then to be lighted, with precaution, under the chair; whereupon, vapor will soon be generated in sufficient quantities for the purpose in view. Drinking plentifully of water at the same time

assists the flow of perspiration. Time may be saved by having the water first heated near to the boiling point. In a few minutes copious perspiration is induced. When this has lasted for a few minutes, the blankets are removed, and then the patient may enter a tepid bath, or he may be tucked in bed under blankets and continue the perspiring process. This mode of curing a cold, except the item in it of the vapor, is called in Maine, taking a "rum sweat." It retains the name of "rum" because New England, in what are called in America "old times," knew scarcely any other spirituous liquor. Even now, when, in New England it is intended to stigmatize a man for too much drinking, he is said to take too much rum, although his beverage may be in fact, and is most likely to be, whiskey. But to return to the question of the treatment. The writer once saw a man in Maine with so bad a cold that he spoke in a whisper, and yet was perfectly well the next day after having taken a "rum sweat."

A vapor bath can be given a bedridden person by wrapping two or three hot bricks in moistened flannel and placing them under the bed-clothes; by which means an abundant perspiration may be produced. This is a reliable method in the treatment of many diseases. It needs, however, the advice of a physician to render it safe.

What is known as the "cold wet-pack" is an excellent method for obtaining the therapeutic benefit of water. In this, water is administered by protecting, with india-rubber cloth, the mattress upon which the patient lies. A sheet is then saturated with cold water, wrung out, drawn under the body of the patient, and its sides folded over and tucked in under him. The heat emitted by the body, especially in fevers, soon converts the water into vapor, and copious perspiration ensues. When patients are weak and nervous and shrink from the shock of a cold general bath, the cold wet-pack is a very valuable substitute for it. It causes at first less chill than the other, and the heat of the body soon warms the sheet.

Water is sometimes usefully applied by means of the douche,

or constant stream poured upon a certain portion of the body. The force with which the liquid strikes the surface can easily be regulated. The douche stimulates the action of the skin and has a beneficial influence upon deeper parts. It should never be applied very long at a time, especially in the case of persons of nervous temperament. It may be used with advantage in cases of sunstroke, fevers, headache, neuralgia, and chronic rheumatism, and has a decided influence in allaying and removing itching. Cold baths are valuable in the treatment of fevers, inflammatory affections, rickets, sunstroke, etc.

In the summer diarrhoea of children, so often fatal to infants in large cities, the lining membrane of the bowels is in a condition of irritation or of positive inflammation. The skin is hot and dry from fever. The little sufferers turn from food with disgust, or else throw it up soon after it is eaten. The application of cold water to them under these threatened conditions has been found useful. The illness is directly or indirectly caused by heat. The interior of the body is suffering from a surplus of heat, by reason of the active changes that accompany inflammation of the bowels. Abstraction of heat from it is therefore urgently demanded in the crisis. This object is accomplished by placing the children so attacked in a moderately cold bath, or by applying repeatedly to the abdomen (the belly) a fold of linen cloth wrung out in cold water. The warm bath relieves pain and spasms.

Before dismissing the subject of bathing, it may be interesting for the general reader to be told something authentically about the "Kneipp Cure," which originated in Germany and spread to some extent thence to other countries. It was introduced by a German parish priest, named Kneipp, whose principal agencies recommended for the cure of disease are cold water douches, foot-baths, head-baths, and sitting-baths. When cold water is given by him in the form of drink, it is often an infusion, or a decoction of alcoholic tinctures. He insists that the body shall be trained by exposure to air, whether or not asso-

ciated with ice-cold water. Children, he thinks, should go without shoes or stockings. Adults, he thinks, should, even in winter's snow, walk barefooted. The snow required, however, as he specifies, should be freshly fallen, sifting, fine as dust, and there should be a piercing wind blowing. The time of a walk in the snow should be, according to him, not over three or four minutes. A walk in running water is supposed by him to have a decidedly tonic effect on the system. Father Kneipp prescribes a certain dietetic regimen in connection with his cold water recommendations.

The virtues of an open-air life, activity, exposure in proportion to robustness, frequent contact with the tonic influence of cold water are incontestable. It needs no physician to convince people of these facts. The experience of countless generations has borne witness to their truth. Such practices, however, cannot be indiscriminately used, nor used by anybody without precaution. The best chance for their success is found in robustness of constitution, and in their having been practiced early in life. No doubt the body, but not everyone's body, can be habituated to a certain amount of exposure, that is, it can be by exposure what is popularly called "hardened." But safety and benefit in the process depend upon the condition of the person and the degree of exposure as related to that condition. To take any person at random, say, a person in any way feeble or temporarily enfeebled, and submit him to such stress as that recommended by Father Kneipp, would certainly not harden, and might prove fatal to him. If he should walk barefoot through the snow in a piercing wind, he would be likely to acquire bronchitis, pneumonia, pleurisy, rheumatism, or some other severe ailment. Enthusiastic, non-professional men may do good by calling attention to the virtues of cold water, by banishing the apparent dread of bathing which actuates many people. It should, however, be known by them that cold water is therapeutically a double-edged sword. It cuts both ways. It is potent for evil as well as for good. Alas! fads are endless! we have

ignoramuses that would teach us how to save our bodies, and others, how to save our souls! In this country, the adoption of Father Kneipp's method has not seemed to proceed further than to induce some people to get up at daylight and walk barefoot through the morning dew. There are no known bounds to human credulity. It may never occur to such persons to think that it may not have been the dew or the barefootedness that may have done them good, but the rising from over-indulgence in sleep, the fresh air, the exercise, that gave them their appetite for and digestion of the following breakfast.

CHAPTER X.

DIGESTION AND INDIGESTION.

THE process and order of nature in digestion is this. The blood is made and renovated by the food we consume and the air we breathe. The blood, in turn, nourishes the body. It remains to consider how the various solid and liquid substances which we use as food are converted into blood. To account for this without going into difficult questions of chemistry is the object of the present chapter.

When the science of chemistry had sufficiently advanced to enable experimenters to make analyses of organic bodies, it was found that animal and vegetable substances are similar. It was also found that vegetables have the wonderful property of transforming inorganic matter, derived from the soil, into organic matter; that is, matter having the attribute of life. Directly from the vegetable world, and indirectly from the lower animal world, we feed upon vegetables—directly upon vegetables as such, and indirectly upon them through our consumption of the meat of animals which have been nourished on them. Articles of food consist of the organic and the inorganic. The organic part of it is formed of albumen, starch, sugar, fat. The inorganic is formed of mineral salts. Besides, we consume vegetable acids, present in fruits, and in a substance called *pectine*, a jelly yielded by fruits and some other vegetable products. Water, too, is indispensable to the processes of life, and must, therefore, be reckoned a true food. The air, too, as effecting through its oxygen a change in the blood, is regarded as a food.

Albumen has been called the physical basis of life. It is an exceedingly complex substance, the highest product of organic action, and is present in all the cells, tissues, and secretions of the body. Produced from so many sources as it is, it should not be deemed strange that it varies exceedingly in composition.

Thus the albumen of the white of the egg, which is regarded as the typical form of albumen, is not the same as that of the yolk of the egg, and both differ from the kind of albumen found in butcher's meat. Flesh contains several distinct forms of albumen. The albumen of milk is not identical with that from vegetables, and the albumen from the milk of different cows varies in composition. Finally, not only does the albumen of the blood differ from the kinds already mentioned, but no less than sixteen kinds have been demonstrated as present in the human body. Notwithstanding these facts, however, the differences among the various kinds of albumen are comparatively slight, and relate chiefly to the greater or less solubility of different specimens of albumen and the various temperatures at which they coagulate under the application of heat. The white of the egg is taken as the type of albumen because it is so well known as the food of the developing chick.

Albumen in its usual form is insoluble in water, and coagulates upon being heated. Every cook sees this when she boils an egg, or empties a raw one into the frying-pan or hot water. Our nutritive supply of albumen is chiefly obtained from the meat and eggs which we eat, although a notable portion comes from vegetable articles of diet. Certain vegetables are much richer in it than are others, among which may be especially mentioned peas and beans. But it is for other food-principles that we depend upon vegetables; chemically, albumen consists of carbon, oxygen, hydrogen, nitrogen, sulphur, and phosphorus, combined in some cases with a trace of iron. Its constitution is here pointed out to the reader with the object of indicating a fundamental difference between it and other alimentary principles. Fat, starch, and sugar are destitute of nitrogen. Organic foods are therefore divided into nitrogenous, embracing the various kinds of albuminous substances, and the non-nitrogenous, which include the fats, starches, and sugars.

Fats and oils agree in chemical composition, and differ only in the condition of solidity or fluidity, which is sometimes

owing only to temperature. Like albumen, fat is derived from many sources, both animal and vegetable. In addition to the fat of meat that overlies the muscular fibers, a large amount is intimately mixed with the muscular tissue, and not recognizable by the unassisted eye. A good deal of fat is contained in eggs. The white of eggs consists almost exclusively of albumen and water. On the other hand, nearly all the fat of the egg is stored in the yolk, which contains much less nitrogenous matter and water than does the white. The fatty portion of milk, that is, cream, is extracted from it in forming butter. Cheese contains much fat, though it is chiefly composed of albumen. Some kinds of fish, especially salmon, mackerel, and eels, are rich in fat. To some degree, fat is present in all the vegetables that come to table. Nuts and olives contain a good deal of fatty matter.

Almost everyone is familiar with the appearance and with some of the properties of starch. It is obtainable exclusively from the vegetable kingdom. It consists of small oval or roundish particles in seeds, roots, stems, and in some fruits. The particles or granules form layer upon layer arranged around a common center, the outermost layer being of the hardest consistency of all. The granules are not sensibly affected by cold water; but boiling water causes them to swell up, burst, and form the well-known mucilaginous mixture used for laundry and other purposes. Among the foods in which starch is particularly abundant are wheat, rye, barley, oats, Indian-corn, buckwheat, and rice. Starch forms about half in the composition of peas and beans. White potatoes contain about a fifth of starch, sweet potatoes, somewhat less. Various farinaceous (floury) preparations are commonly used for food, sago, tapioca, arrow-root, corn-starch, etc.

Two types of sugar are recognized. These are known as cane-sugar and grape-sugar. Their names point to their origin. The beet contains about one-tenth of its weight in sugar; and, upon the continent of Europe, the manufacture of beet-sugar is prosecuted on a large scale. Grape-sugar, or glucose, commu-

nicates sweetness to grapes and other fruits. It is, however, five times less sweet than cane-sugar. Besides using sugar in the common commercial forms,—white, brown, lump, powdered, granulated,—we eat it in the form of candies, syrup, molasses, sorghum, maple-sugar, honey; it is even found in muscular fiber.

The alimentary principles just noticed form the chief part of our diet. Other substances belonging to it are of minor value as nourishment, although they cannot be entirely dispensed with in our physical economy. For instance, the vegetable acids present in fruits, although not particularly nutritious, are of service in preserving health. This is shown in one way by their influence in averting scurvy, a disease which is seldom seen at the present day, but which in former times committed great ravages amongst soldiers and sailors. Since the cause of scurvy has been ascertained, no ship puts to sea on a long voyage without ample supply of lime-juice. In Dr. Kane's expedition towards the north pole, the supply of potatoes came down to a single one; scraped off little by little, it was doled out and finished, in the interest of staving off scurvy. By the simple addition of lime-juice to the stores for Arctic and other long voyages, scurvy has almost disappeared from the earth.

Water is an indispensable constituent of our food, facilitating, as it does, the solution of the food in the process of its absorption as blood. Blood is a watery liquid which holds nitrogenous, fatty, starchy, saccharine, and other substances in solution. The first process of digestion is the reduction of these various substances to liquid form. In so far as this is not attained, the act of digestion is imperfectly performed, and symptoms appear indicative of its embarrassment. So long as articles of food taken into the stomach remain undissolved, so long they cannot traverse the walls of the stomach and bowels, to be absorbed by the blood. With the exception of sugar, all the nutritious principles of food which have been named are insoluble in water. It follows, that they must be so changed by the process

of digestion that they will dissolve in water. To be digested, the substances, insoluble in water as we imbibe them, are, or ought to be, rendered soluble in the stomach, in order that they may be taken up by the blood, then seized by the various tissues of the body, and then deposited in the insoluble form of their structure.

The manner in which this is accomplished will now be stated as clearly as possible. Digestion of food is begun in the mouth with saliva, continues in the stomach, and is completed in the small bowels. The preliminary for good digestion is proper mastication of meat. It has been alleged that Mr. Gladstone said he gave thirty-two chews to every morsel of meat. If true, it would go to show either that he was unnecessarily particular, that his dental apparatus was not in good order, or that the meat of England is particularly tough. Anyhow, true or not, Americans can get along with less than thirty-two chews, and like to have time to talk instead of counting in the intervals of eating dinner. But, to return more particularly to our subject, every one knows that when we wish to make any substance readily dissolve in water, we reduce it to powder, if possible. One of the first things that an apothecary's boy learns is to pulverize substances before making them into fluid preparations. Now, the teeth are the instruments with which nature furnishes us to convert our food into a more finely divided state than that in which it is taken into the mouth. Since the nerves of taste are distributed to the tongue, one should suppose that prolonged contact with all the nerves of taste would be so pleasurable that mastication of food would be thoroughly performed. This is, however, by no means general. Food is often hurriedly, and therefore insufficiently, divided and hastily delivered into the stomach in a condition unfit for the action of its gastric juices.

This is a frequent cause of dyspepsia. The habit of rapid eating, sometimes of bolting food, may be the first link in a chain leading to discomfort, misery, and death. There is no excuse for such a habit of eating. The dinner-time should be a

sacred hour for slow eating, interspersed with pleasant talk. There are people who gorge like wild animals, breathing not a word during the time of feeding. Nothing better characterizes the difference between refinement and vulgarity than modes of eating. In one, the process of eating is made to seem secondary to social intercourse; in the other, it has no such seeming, but the mere animal creature is revealed as a quite unsocial being. Lads often begin the unhealthy practice of bolting their food by lingering too long in bed and then trying to make up for lost time. Merchants sometimes sacrifice their luncheon-hour to business. In respect to this matter, laborers have an advantage over the commercial classes. When bell or whistle announces midday, all work is dropped for an hour; ample time for eating and a little rest.

While food is being divided by the teeth, it has time to mix with the digestive fluid, saliva. This fluid serves several purposes. It aids the sense of taste by dissolving some of the constituents of the food, it moistens the food so that it is more easily swallowed. It performs, however, a still more important part in the act of digestion. It begins the chemical transformation of insoluble starch into soluble sugar. It contains a ferment by which this change is begun and partially effected while the food is within the mouth.

In the act of swallowing, food first passes from the mouth into the *pharynx*, which is a pouch suspended from the base of the skull, attached behind to the front surface of the spinal column, and communicating in front with the nasal cavities and the mouth. The *pharynx* also communicates, through the Eustachian tubes, with the interior middle part of the organ of hearing. It is surrounded by three constrictor muscles, which contract and press forward the food into the *œsophagus*, or gullet. The lower part of the *pharynx* is narrowed and continuous with the *œsophagus*, which is nine inches long in the adult, leading directly into the stomach. The rings of muscular matter that surround the *œsophagus* are not under control of the

will, but are excited to action when food enters this tube of the *œsophagus*. Every one must have had the experience, at some time or other, of trying to prevent swallowing a morsel when the opening of the *œsophagus* clutched and swallowed it automatically.

It is usual to speak loosely of digestion as if carried on entirely by the stomach. But, in reality, it is only a portion of the food imbibed which is acted upon in that organ. The stomach is a large pouch situated at the beginning of the intestinal tube. The soft membrane with which it is lined secretes the peculiar fluid called the gastric juice. This is an acid liquor and is composed of an organic ferment called *pepsin*, together with some free hydrochloric acid and some inorganic salts dissolved in water. In the interval between two digestions, the gastric juice is retained within the tubes by which it is secreted, and is discharged into the stomach only when its presence is needed for action upon food.

During the supply of food to the stomach, the saliva continues its conversion of starch into sugar. As, however, the saliva, which it has partially absorbed, is an alkaline fluid, it becomes neutralized in coming in contact with the acid gastric juice of the stomach. The digestion of starch by the stomach is therefore suspended as long as food remains in that organ. While there, food is subjected to a sort of churning process, whereby it is liquefied and intimately blended with the gastric juice. The walls of the stomach are muscular, and in their contractions the organ is swayed to and fro, from side to side. At the same time, the food within it shifts about in this churning process. These movements continue as long as there is any food remaining in the stomach.

The special office of the stomach is to produce in the albuminous constituents of our food a change of such a nature that they become soluble and thus capable of being absorbed by the blood. This is the reason for the prolonged retention of food in the stomach. The lower part of the stomach is guarded by

a thickening of the muscular fibers to so great a degree as to form a closed ring. This ring is so constituted as to bar the passage of food from further descent until it shall have become sufficiently liquefied. It is the albumen which, the most complex and the most necessary element of our diet, presents the greatest difficulty to the digestive function. Starch, as has been already said, is readily and rapidly converted into soluble sugar. Fat does not need to be chemically changed. The manner in which it is acted upon will be presently described.

As pepsin, like yeast, is a ferment, a very small amount of it is capable of acting upon and transforming a large quantity of albumen. It has been found, however, that beyond a certain quantity, the presence of the converted albumen prevents further action of the pepsin. From this, it was learned why it is that, if we eat too great a quantity of animal food, we are visited with an attack of indigestion. As the albumen is gradually rendered soluble, the muscular ring at the bottom of the stomach relaxes from time to time and allows a certain quantity of liquefied food to pass into the bowel. This relaxation at intervals may be compared to the occasional opening of a sluice-gate. As the chemical changes approach completion, the material is allowed to escape with increased rapidity.

The time required for the digestion of albuminous substances and their passage into the bowel differs according to various circumstances. Digestion goes on more or less rapidly according to the kind of food eaten, the quantity, the interval which has elapsed since the last meal, the general condition of health, and even the state of the weather. As an average in time, however, it may be stated that from three to four and a half hours after being taken, an ordinary meal has left the stomach, owing to the fact that it has been digested.

Opportunity to examine the interior of the stomach has occasionally been afforded by persons having, in consequence of a wound, an opening from the outside into that organ. Many years ago, Dr. Beaumont, an army surgeon, was able closely to

study the case of a person so afflicted. He found, to use his own language, that "in disease or partial derangement of healthy function, the mucous membrane presents various and essentially different appearances. In febrile conditions of the system, occasioned by whatever cause,—obstructed perspiration, undue excitement by stimulating liquors, overloading the stomach with food, fear, anger, or whatever depresses or disturbs the nervous system,—the villous coat becomes sometimes red and dry, at other times pale and moist, and loses its healthy appearance; the secretion becomes vitiated, greatly diminished, or even suppressed; the coat of mucus scarcely perceptible, the follicles flat and flaccid, with secretions insufficient to protect the papillæ from irritation. There are sometimes found, on the internal coat of the stomach, eruptions of deep red pimples, not numerous, but distributed here and there upon the villous membrane, rising above the surface of the mucous coat. These are at first sharp-pointed and red, but frequently become filled with white purulent matter. At other times, irregular, circumscribed red patches, varying in size and extent from half an inch to an inch and a half in circumference, are found on the internal coat. These diseased appearances, when very slight, do not always essentially affect the gastric apparatus. When considerable, and particularly when there are corresponding symptoms of disease,—as dryness of the mouth, thirst, accelerated pulse, etc.—no gastric juice can be extracted by the alimentary stimulus."

What is meant by "the alimentary stimulus" is the food taken into the stomach, which ought, in its healthy condition, to excite a flow of the gastric juice. For the benefit of the non-professional reader it is well also to explain what is meant by Dr. Beaumont, in the preceding description, by the words, *the villous coat* and *the follicles* of the interior of the stomach. The *villous coat* is the mucous membrane lining the stomach, called *villous* because it is in folds; and the *follicles* are the minute glands of the interior of the stomach, set like little tubes in its mucous membrane.

Gastric juice begins to pour into the stomach as soon as food is taken into the mouth. Its secretion is stimulated by condiments, such as pepper, Worcestershire sauce, etc. Although these excite the appetite and increase digestive power, they should not be used so freely as to make the stomach depend upon them; for their too lavish use might even bring about digestive disturbances. In a word, they are capable of overstimulating the organs concerned in the complicated process of digestion. The condition of the nervous system has much to do with regulating the secretion of the gastric juice. Strong emotion will at once check its flow. That is the chief reason why the process of dining should be associated with pleasant surroundings of scene, companionship, and conversation. It is one of the reasons why a meal, as a feature of a picnic, is so enjoyable, for pleasurable emotions increase the flow of the gastric juice and digestion proceeds agreeably.

After food has been taken, the flow of blood, through a strong nervous influence, is directed towards the digestive organs, and the process of digestion is embarrassed if mental or physical work be immediately resumed. The reason justifies the selection, wherever possible, of the hour for the chief meal of the day after the main business of the day shall have been accomplished. Agitating or depressing topics of thought or of conversation should be scrupulously avoided at table. Cheerful demeanor and conversation, on the other hand, facilitate digestion, and with it, promote contentment and comfort. To have a good appetite, to eat with temperance and gratification, to digest perfectly, involve boons for which we should be truly thankful. In so far as circumstances will permit, we should avoid everything liable to disturb this healthful activity. The best of all rules to ensure temperance in eating is to eat slowly; the best of all to ensure good digestion, is to rise from the table, not hungry, but feeling as if we could eat a little more with pleasure.

When food leaves the stomach and enters the small intes-

tine, it comes almost immediately into contact with two important fluids. These are furnished respectively by the liver and the *pancreas*. They are poured into the intestine about three and a half inches beyond the opening in the stomach from which the food has departed. Both bile (from the liver) and pancreatic fluid (from the pancreas, known, when from the calf, as sweet-bread), differ from the acid gastric juice, in being alkaline. Bile is elaborated within the liver, and serves the purpose of removing waste elements from the body, and yet it is used in the digestive process. Its action in this respect is not as decided, however, as that of the gastric or the pancreatic fluid. Bile has some influence in converting starch into sugar, but has none on albuminous substances. It breaks up oil-globules so that they readily pass through the walls of the bowel. It has other functions, among which is the one that it stimulates the secretion of the intestinal juice, another fluid concerned in the work of digestion.

The fluid which the pancreas secretes has the most universal influence upon the ingredients of our food. It contains three different kinds of ferments which act upon three different kinds of alimentary principles. Any albumen which may have escaped conversion in the stomach is transformed into soluble substance by the pancreatic fluid. The chemical changes which were arrested in starch by the acid gastric juice are resumed in the bowel under the influence of the pancreatic fluid; and the starch, insoluble in the gastric juice, is completely changed into soluble sugar. But it is as the agent by which fat is principally digested that the pancreatic fluid is most important as an agency. In sugar and albumen, it but assists and completes the action begun by the saliva and gastric juice. The glands situated in the walls of the small intestine also secrete a fluid which plays a subsidiary part in the process of digestion.

It is not enough for health that food be digested. We can imitate this function of digestion by chemical procedure. Indeed, the artificial or partial digestion of food is now common,

and affords an extremely useful method in the medical treatment of debilitating diseases. The great object in promoting digestion is to present food to the stomach in such a condition that it shall be absorbed by the blood. Were it not received by the blood, it would be of no more use to us than if it had remained on the table. Digestion is the first step, and a mighty one, in the nourishment of the body. Its products in solution enter the circulation by traversing the membranous walls of the bowel. Some of the nutrient principles are received directly into the blood-current, while others pursue an indirect course to that end by passing, first of all, into absorbent vessels of the system. The absorbent vessels, coming from different portions of the bowel, are finally gathered into a single vessel, along which the liquid flows until it is finally emptied into the blood at a distant point. The small absorbents have passed through numerous glands, where they are acted upon in such a manner that the composition of the fluid derived from the alimentary canal gradually approximates to that of the blood. Most of our fatty food takes this described indirect route to the blood. Much of the albumen and sugar, on the contrary, passes at once from the bowel into the blood-vessels. The difference of route is, however, more apparent than real; for, whereas, the fat is carried by the absorbing vessels, the other alimentary principles are conveyed to the liver. In that large and important gland, further changes are effected in albuminous principles. They reach the liver, we may say, in the form of comparatively raw material, which must be refined to fit it to become a component of the blood and the various tissues of the body. Secondary elaboration of substance in the body is of capital importance. Chemical changes are effected which result in the production of the nutritious matter which enters the blood; but, on the other hand, deleterious matter is carried to the kidneys, and by them cast out of the system. Both liver and kidneys have waste-products which tend to be eliminated, and, if retained, poison.

It entails no great strain on the system to eliminate sub-

stances perfectly dissolved, but constant attempted passage of insoluble substances is a source of irritation. When the liver is habitually out of order, it is not able to perform its function. The supply of nutritive substance in it is diminished, and the amount of insoluble substance is increased. The waste not eliminated with ease affects the kidneys as it passes out, remains in the general circulation for a long time, and excites disease. The person so afflicted becomes irritable. Appetite fails, and sleep is disturbed. Insomnia is a frequent concomitant of the condition. The heart beats violently and irregularly, attacks of bronchitis or asthma may occur, and eruptions appear upon the surface of the body. The mind is sometimes so profoundly affected as to become hypochondriacal, or with such perversion as to become suicidal. The kidneys become affected. Some form of Bright's disease of the kidneys may ensue. Gout may occur as the culmination of a train of such physical ills, for dyspeptic troubles are among the best known precursors of gout.

Plato, in his "Republic," points out the relation of athletics and temperance, recommending moderation in both. The proper way of training men to be defenders of their country, he states in the following terms: "On these points we may take a lesson even from Homer. You know that, at the repasts of his heroes, when they are in the field, he never sets fish before them, although they are on the shore of the Hellespont, nor yet boiled meat, but only roast, which soldiers could, of course, procure most readily; for anywhere, one might say, there is less difficulty in using mere fire, than in carrying about pots and pans. Neither has Homer, if I remember right, ever said a word about sauces. However, this is well known, I believe, to all that are in training, as to Homer, that a man who desires to be in good condition physically, must abstain from all such indulgences." Plato conceives that the properly trained man will possess good digestion, insusceptibility to take cold, freedom from such diseases as are caused by irrational living, will have, in

a word, good health. He says: "And do you not hold it disgraceful to require medical aid, unless it be for a wound, or an attack of illness incidental to the time of year—to require it, I mean, owing to our laziness and the life we lead, and to get ourselves so stuffed with humors and wind, like quagmires, as to compel the clever ones of *Æsculapius* to call diseases by such names as flatulence and catarrh."

We should no more eat to satiety than we should drink to excess. Immoderate indulgence in the pleasures of the table spoils the complexion, bloats the face, dulls the eye, and gives rise to many diseases. Every one should observe a judicious caution as to the quantity and quality of the food taken. On the other hand, a person should not be continually thinking and talking about digestion. The habits of life here inculcated lead to good digestion, health, and prolongation of life. Excepting regard for physical idiosyncrasies, which everyone ought to find out from personal experience, a healthy person dines with variety without a thought of his or her stomach. In fact, a healthy person is so well as to be almost unconscious of having a stomach.

Addiction merely to what are called the pleasures of the table, which is, in fact, gluttony, and immoderate use of spirituous beverages of whatever kind, are destructive of good looks in both men and women. But intemperance in eating and drinking has worse consequences than even these. By it, sluggishness both of mind and body is produced, besides sensual expression of face and loss of all symmetry of body. We do not read nowadays of men given to any excess who are distinguished in any walk of life for intellect or deeds of note. As has also been here mentioned, there is a close connection among the attributes of virtue, health, and beauty. Transgression of the laws of nature, or of the highest moral code of a community, brings with it penalty. The time was, before the Christian era, when men and women could permit themselves a license which is no longer, under another dispensation, recognized by others or by themselves as tolerable. So low anciently was the

status of morality, that, in sexual relations, they were so loose as to indulge in orgies, without shame, because without realization of their atrocity. In such times of depravity as those, they could retain much physically which, at the present day, is swept away with the consciousness of sin and vice. A Cleopatra could then retain her beauty without stamp of sin. But now, do what men and women may to conceal their moral looseness, which of old seemed no sin, the higher consciousness of Christian society, and their own, stamps them indelibly in public view. Certain lines of which they are unaware come gradually on the face. The whole expression, brightness and freshness of eye, tint of complexion, are inevitably changed, for transgression will have its say in printing character on the features.

The physical effects of a system of diet, combined with exercise, are well exemplified by the condition of men in training for some kind of athletic contest. The skin becomes clear and ruddy, any eruptions which they may have disappear. Their eyes are bright, their muscles firm. They experience a sense of elasticity throughout their limbs. The action of the heart has been strengthened, so that the circulation is able to meet increased exercise. This is the greatest of all the advantages in the training, for it relates to the most vital organs, and its effect has been demonstrated to be permanent. Increased breathing capacity, too, proves a safeguard against diseases of the bronchial tubes and lungs. Considering that a course of training does not generally cover more than six weeks in time, it may, with advantage, always be prescribed for young men and women whose muscular system is decidedly undeveloped. This is the present tendency of universities, colleges, and certain schools, to insist that all students shall take a certain amount of gymnastic exercise. Among women, athletics take the milder form called calisthenics.

Just as albumen differs in minor particulars, according to the source whence it is derived, so do sugars similarly differ for the same reason. Sugar is a normal constituent of the animal

body. It is contained in the liver, in muscular tissue, in the lungs, kidneys, spleen, and brain. It appears in these parts in at least three different forms. Their appropriation of it, therefore, must be analogous to that by which albumen is appropriated by the organs of the body. We consume sugar associated with both animal and vegetable food, but far more with vegetable than with animal food; and the amount is augmented by the transformation into sugar of the starch we imbibe in the manner that has been already described. All varieties of it, whencesoever derived, are absorbed into the blood and also removed from it by the several organs described. In addition to sugar, the liver contains a large amount of a peculiar substance, similar to starch, which is easily converted into sugar. The animal starch, as it may be called, is manufactured by the liver chiefly from the elements furnished by vegetable food. When, from any cause, the starch-producing function of the liver is interfered with, superfluity of sugar appears in the blood and symptoms of the disease known as *diabetes* manifest themselves. Hunger and thirst become inordinate in the patient, great quantities of liquid are consumed by the system, and yet the drain continues, nutrition fails, the blood deteriorates more and more, and the case proceeds to a fatal issue. A number of grave constitutional disorders come from derangement of the functions of the liver. Slighter ones, produced by lesser disturbance of them, are met with every day. This is the reason why, from choice of food to its digestion, we should care for the action of the stomach.

Fat is useful from the æsthetic point of view, on account of its covering irregularities of bone and muscle. Being a non-conductor of heat, it is also useful in protecting from the cold of the atmosphere. It forms a reserve upon which the individual man or woman may draw for energy and the prolongation of life. Northern peoples of the globe instinctively consume large quantities of fat. The Eskimo devour the blubber of whales and seals, and consider even a tallow-candle a dainty. In the tropics,

on the contrary, but little fat food is consumed. Fat is a substance intimately associated with albumen in the constitution of cells and fibers, and contributes to the production of muscular energy. A prize-fighter comes out of the ring, after a severe contest, weighing several pounds less than when he entered it. The waste represents the exact amount of energy that he has expended.

The indispensable and most healthful drink is pure water, the liquid which most effectually assuages thirst. It is a necessary constituent of the body; the fluidity of the blood and of the various secretions depends upon its presence. The process of digestion is promoted by drinking a certain amount of water, the first condition of digestion being solution, that is, the liquefaction of solid food. Water is the basis of all other beverages. It is present in small amounts even in solid food, and to this amount cookery generally adds more or less, with the result of making food more succulent. The question is often asked, whether water should be drunk while eating, or should be taken only after a meal. The answer to this depends upon the character of the food eaten and upon the particular constitution of the eater. Very dry or salt food needs an occasional swallow of water while being eaten, for moistening the mass in the stomach, and for stopping the thirst. Persons in perfect health, whose digestive fluids are abundant and efficient, need, while eating, no more water than sufficient for their thirst. There is a just mean to be observed between taking no water at all while eating, and the other extreme of flooding the stomach with it. The habit of drinking copiously of ice-water during meals retards the digestion, of course, by lowering the temperature of the stomach, but, in a healthy person, will not make indigestion. As, however, the practice of drinking ice-water freely belongs especially to the summer, the time when perspiration is profuse, it must be remembered that we can, with propriety, take much more water then than at another season of the year.

Coffee possesses but little value as a nutrient, yet, as gen-

erally drunk, with cream or milk and sugar, it is the means of supplementing food in the system. By some chemists it has been surmised that coffee is useful in diminishing the waste of tissues, and that it thus enables a certain quantity of food to have more effect than it otherwise would. Coffee is of decided benefit when, from any cause whatever, the body's food is decreased or not at all supplied. Aboard ship, at daylight, crews work cheerfully for a couple of hours while their breakfast is preparing, reinforced solely by a pint tincupful of boiling hot coffee. It relieves the sensations of hunger and fatigue of troops in bivouac or on the march, of sportsmen and day laborers, of all human beings subject to physical stress. This is an experience of the whole world that has ever come into contact with human beings suffering from fire, flood, or earthquake, and needing some immediate succor to failing energies. Taken in moderation, it renovates the system, but taken immoderately, it has an injurious effect on the nervous system, disturbing the healthful functional activity of the liver. It is well known to produce wakefulness, and, therefore, should not, under ordinary circumstances, be drunk in the evening. Those who have a night-watch to keep, however, will drink coffee with advantage. Professional men, in writing at night, sometimes resort to coffee for its stimulant effect, in order to keep the brain sleepless and active. This is a bad habit, or rather, is a combination of bad habits. Eight hours of sleep are required for health; these cannot be encroached upon with impunity. A better practice is to retire early, get up early, and then devote the time to brain-work. Then is the time for the cup of coffee. It will banish all cobwebs from the mind and body and keep them pleasantly atune until time for breakfast.

The action of tea upon the system is similar to that of coffee. It exhilarates, and, like coffee, supports the system under deprivation of food. The fact is not generally recognized, that tea, as well as coffee, causes wakefulness. Indulged in to excess, it seriously impairs the health of the nervous system. It

contributes little or nothing directly to the organism. Used in moderation, this beverage is an agreeable one at various times known to society. On the other hand, taken in strong infusion, and in large quantities, it may bring about nervous disorder. We once knew a professional tea-taster who confessed to us that he had grown so fond of the drink, that he was professionally and privately drinking it all day long. He had become so reduced in flesh, and was so nervous, that nothing but a voyage to Europe seemed to save him. He came back from that, after some months, after long abstention from his vice, so stout that he was hardly recognizable. A large number of poorly paid and overworked women consume a great deal of tea instead of substantial viands for which its cost would at least partly pay. Not losing much time in preparing and drinking it, and perceiving its agreeable stimulation, they become accustomed largely to depend upon it, but all the conditions of their life are unhygienic, and they introduce this one which aggravates their evils.

Tea-drinking among the well-to-do is peculiarly associated with the idea of domestic quiet and comfort. Cowper writes:—

“Now stir the fire and close the shutters fast,
Let fall the curtain, wheel the sofa 'round,
And, while the bubbling and loud-hissing urn
Throws up a steamy column, and the cups
That cheer, but not inebriate, wait on each,
So let us welcome peaceful evening in!”

The excessive fondness of Dr. Johnson for tea, and the number of cups of it that he could drink, are as much a part of our mental picture of the man as are his ungainly form and modes of speech. The Russians are much addicted to the use of tea prepared in the great “*samovar*,” or urn, that they use, a conspicuous feature of every inn in Russia. They use a small infusion of lemon-juice in their preparation of the beverage. In Russia, too, tea is made up into compact masses which have

been subjected to pressure so heavy as to make them, with the fatty matter that is introduced in the manufacture, as hard as plugs of chewing tobacco. These, on journeys, can be dissolved for use as a drink, but they are sometimes also eaten as food.

Chocolate, prepared with milk, makes a rich and palatable beverage. It is used largely in this country, but not so habitually as either tea or coffee. In Mexico, the West Indies, and in South America, it is an article of universal consumption. It is of decided nutritive value, the relation of its nutritive ingredients being about one-tenth of starch, about two-tenths of albuminous matter, and about five-tenths of fat. It is an agreeable and nourishing drink to those whose stomachs can assimilate it, but for some persons it contains too much oil for easy digestion. However, in its finer varieties, where the oil is largely decreased in the manufacture, that objection is generally removed. Those persons who cannot drink chocolate can often drink cocoa without difficulty.

The question whether or not alcoholic drinks possess any value as food has been and still is debated among physiological chemists. It would seem that alcohol adds to the body nothing of which it stands in need, or which cannot be obtained from other sources, and, therefore, that it cannot be regarded as contributing directly to nutrition, that is, cannot be a true food. A moderate amount, taken with or after a late dinner, may be beneficial in promoting digestion. Healthy adults need no alcohol. A small amount of alcohol may excite secretion of the gastric juice, but a large amount is apt to embarrass digestion by precipitating the pepsin of the stomach. The secretion of this digestive fluid is active enough in those who are constitutionally strong and who obey the laws of health.

Of the danger of forming a habit of taking spirituous liquor and of the wide-spread evil which it causes, it needs not to enlarge here, the consequences of that kind of overindulgence being so well known. It is enough to state that the irregularities wrought by excessive use of alcohol inevitably undermine

the health and constitution. The constant presence of alcohol in the circulation induces many alterations in the normal composition of the solids and fluids of the body, and interferes with the processes of its nutrition. An alcoholic beverage may, however, be judiciously used for relieving excessive fatigue or pain. Physical or mental depression of tone from severe labor may occasionally warrant its employment, and under these conditions it materially aids digestion. Elderly persons may, with propriety, use some form of alcoholic beverage with advantage, especially at dinner. It delays the waste of tissue, and is thus an economizer of strength. There are other occasions when alcohol may be of service to the system, but those are they which should always be considered as medical treatments, and be under the supervision of a physician. The practice in some countries where the grape is plentiful, of drinking light wines at dinner, seems very conducive to the cause of temperance.

The people of this country undoubtedly eat too much albuminous food, especially animal food. Habitual diet is most advantageously composed of substances drawn from the vegetable as well as from the animal kingdom. The injury resulting from excessive consumption of nitrogenous substances has already been here described. The abundance of food in the United States, the general prosperity of its people, the high rate of wages as compared with that of other countries, the consequent free and lavish life here, which foreigners regard as wasteful, lead to the consumption of far more food than the human organism requires, or by which it is benefited. Here come immigrants who, in their native lands, have been chiefly nourished on bread and vegetables, in whose mess meat scarcely appeared more than once a week, and immediately they demand here meat three times a day, according to the too prevalent American practice which they find on landing. Nature here, as elsewhere, allows a generous margin within which the appetite may be safely indulged, but nature therefore prescribes bounds beyond which it is not safe to trench, and exacts inexorably a

penalty for transgression. Every debt to nature must, in fact, be paid in full without discount. Benjamin Franklin, in his autobiography, tells of an old Catholic lady who had an attic room in a house in which he lodged in London, when working there as a journeyman printer. She had been educated abroad, and had intended to take the veil. Her health becoming affected, she had been obliged to return to England, where she had made up her mind to live in seclusion, giving away her estate for charity, reserving for herself only twelve pounds sterling a year. She lived mainly upon water-gruel, and used fire only for the purpose of preparing her food. Franklin, who visited her, remarked that "she looked pale, but was never sick; and I give it as another instance on how small an income life and health may be supported." It is to be remarked, however, of a case like this, that, when there is next to no exercise taken, it requires but little food to support life. Though it be possible in quietude to support life and enjoy health upon a small quantity of food, work requires more; for the body is a machine that must be supplied with fuel to be effective in proportion to power exercised. Nature, however, allows us to eat and drink considerably more than the machine needs, but abstemiousness is always more beneficial to us than overeating, to say nothing of gluttony.

As regards diet, every one should have general rules, but they should not be rigid. We cannot do better than accept our experience from nature. A famous Italian physician once accustomed himself for a time to live with the most undeviating regularity. He had a chair constructed with scales-attachment, by which he knew his weight at a glance. When he had taken a certain weight of food, he immediately arose from the table. But this practice he had instituted for the purpose of scientific research. In ordinary life such precautions are worse than useless; they are hypochondriacal in tendency.

There are, as stated here before, physical idiosyncrasies in different individuals. Some persons can eat with easy digestion

a large amount of some dish which others cannot partake of in the smallest degree without manifest indigestion, indicated by taste of it for hours afterwards, by tendency to eructation, by uncomfortableness, and even by vomiting. There are persons who cannot eat strawberries without cayenne pepper, lest they produce a rash. There are others who cannot eat certain sea-foods. Others, again, there are, who cannot eat pickles, spices, and smoked meats. All such persons, having fixed the fact to a certainty regarding their own peculiarities in this respect, should abstain from the obnoxious foods. For such eccentricities of the stomach there is no cure. We call them idiosyncrasies. Those just discussed relate to foods, but there are also analogous ones, very naturally, with respect to medicines. There are persons who cannot take certain medicines which by the great majority of the world are taken without the slightest difficulty.

Dainty, fastidious eating is more common among women than among men. The appetite of men is generally what may be called healthier than is that of women generally. Women, too, are more susceptible, as a general rule, than men are, to the influences of refined service of a table. But, speaking of the question of eating alone, there are more women than men addicted to kickshaws instead of eating substantial and nutritious comestibles. Nevertheless, some men, not only among the sedentary, but among those of the active outdoor world, exhibit strange likes and dislikes for foods. This, when extreme, has been recognized in many persons as hereditary, but generally it arises from early habits of not seeing variety on the table. Not long since we called to account a man boasting of his varied diet, by enumerating dozens of things that he had never had on his table, and many of which he had not elsewhere had the curiosity to taste. This is no idiosyncrasy of the body, it is idiosyncrasy of the mind.

Some dietetic distastes result merely from prejudice. We have been in parts of the country where farmers, ill supplied

with meat, could not be induced to touch a mushroom, and where they flung away the sweetbread when they sent a butchered calf to market. In the matter of sweetbreads, however, they seem of late years to have had the universal eye-opening of market value. These things obtain among the same people, speaking the same language. When we study the differences in taste among people foreign to each other, their dissimilarity in appreciation of food seems wonderful, even after making all allowances for difference of climate and products of soil. To the average American, even the idea of eating a snail is revolting, but in Paris and some other large cities of Europe, it is thought a great dainty. The oyster, which is here eaten raw with so much gusto, is repugnant to a person brought up in the interior of many countries. And so one might proceed, citing dozens of cases of the sort. Humboldt tells us that the Indian agricultural laborers of Mexico live almost entirely upon Indian corn and cereal grains. The Indians of the Pampas of Brazil were found by Sir Francis Head to subsist entirely upon the flesh of their horses, having neither bread, fruit, nor vegetables. The Gauchos of the Argentine Republic, who are herdsmen, live entirely on roast beef, scarcely ever tasting farinaceous or other vegetable food, and their sole beverage is Paraguay tea, taken without sugar. In former times the Hawaiian Islanders preferred their fish raw, even eating a fish alive and flapping. In the Sahara, dates are the principal article of food for men, women, children, horses, asses, camels, sheep, fowls, and dogs. The Maoris, of New Zealand, think a fat dog excellent food, in fact, a dainty. Camel-meat and milk are the food of the Nubian. The Kaffir, of Africa, thinks curdled milk superior to fresh. The Bosjesmans eat bulbs, roots, wild garlic, gum, berries, the larvæ of lizards, ants, locusts, and grasshoppers. The Chinese eat almost everything. So do the native Australians. There are fat worms which subsist on the juices of certain trees, that have been eaten by some of the natives of South America. The list might be made twice as long as it is, but it is sufficient

to show what diversity of tastes there is, and also that what we call taste for foods is largely a matter of early education.

The Romans, even in their epicurean days of luxury, admitted many articles to their tables which are now discarded by civilized peoples. Meat of puppies was one of their dishes, and also the meat of the ass. Peacocks' tongues and brains were served at feasts. But this was done more for ostentation than for any other reason. The peacock, with its opulent tail widespread, also formed a feature of their banquets. The parade of the tail, however, was taken even then at its true value, as satire shows. The Romans ate swans and cranes, birds of a decidedly rank flesh in flavor. Among fish they seem to have prized most of all the mullet, which shows, if the species is like ours, that they must have had little educated taste to prefer it to some other fish at their disposal. Their apparently most extraordinary dish for a dainty was that of caterpillars. Taste is, therefore, slightly congenital and largely educated: that is, slightly derived from birth, and largely acquired with opportunities throughout life. And a strange law about taste is this, that if, upon trying it frequently, one remains perfectly indifferent to an article of food, one will remain so to the end of his life; but if, on the contrary, one dislikes an article upon first tasting it, one can by persistence acquire for it a taste that is stronger than one's natural taste for other things. The difficulty is in inducing the masses of people anywhere to persist in eating some new food that would be beneficial to them. No country ever needed maize (Indian corn) more than Ireland, subject at times to famine, yet it was once almost impossible to get the people there to eat it long enough to acquire the taste for it. "Why," said an Irishwoman who had come with her husband to this country, "you wouldn't expect me to eat that (meaning little hominy), that's what my husband gives to his horse." In the course of a long time, however, driven by necessity, these people came to like it. Ireland has been chosen here for citation as an extreme case, but well do philanthropists know

how ill their trouble has been requited in the interest of the poor generally of Europe, in their attempts to introduce that food. Yet the number of palatable preparations that can be made from Indian corn is not equalled by any other food on earth. It contains about as much albuminous matter as does wheat, and four times as much fat. Things, however, are in some places different now from what they were seventy years ago. Piedmont, in France, is said to consume now as much Indian meal as wheat flour. In Ireland it has gradually won a great victory, and now stands as an able assistant to the potato. One of our European consuls devoted much time and labor to the introduction of Indian corn as an article of diet into England and on the continent of Europe. All persons who have visited Europe know how inferior the oysters of its waters are to those of America. Yet it has been only within very recent years that there has been demand for ours in England. Now, however, it is said, six thousand bushels of them are, in winter, weekly shipped from New York to England, and that the sales amount to three million dollars' worth of them during their season.

A good digestion is a great blessing; a bad one, especially if it amounts to constant dyspepsia, a great ill. Handworkers, whether indoors or outdoors, are less subject to indigestion than are brain-workers, especially laborers who work in the open air. Nevertheless, cases are not rare among farmers and mechanics where poor preparation and hasty eating of food entail dyspepsia. It seriously interferes with all work, especially with that which is intellectual. Carlyle's denunciation of it is bitter. He says: "The accursed hag, dyspepsia, had got me bitted and bridled, and was ever striving to make my living day a thing of ghastly nightmares; I resisted what I could, never did yield or surrender to her; but she kept my heart right heavy, my battle being sore and hopeless." A peasant by birth and by early experience of life, Carlyle doubtless was poorly nourished for many years, and his great brain action doubtless, also, exasperated the constitutional and acquired weakness of his

stomach. We all know how a meal eaten with relish and perfectly digested predisposes to cheerfulness, and how, on the contrary, little appetite and indigestion are productive of mental as well as physical discomfort. In the race of life one is seriously handicapped by poor digestion. Men successful in any sphere of life may break down in digestion, but in the majority of cases they have at least started with good digestion.

Certain practices which become habits are conducive to good digestion. One is regularity of hours for meals, admitting that the affairs of life do not allow of undeviating attendance. Nature is tolerant of such deviation, but has its limits to concession. People should bear in mind that no business is more important than the preservation of health. The members of the middle classes, with their regular lives in hours of labor, eating, sleep, and recreation, comparative freedom from ambition and exacting responsibilities, have an advantage in this respect over their employers and over the members of the purely frivolous fashionable world of society. Inhabitants of quiet country towns transact business leisurely, and have time to attend to the demands of their bodies. Thackeray gives a pleasant picture of life in a little Swiss town. He says: "The schoolboys, with book and satchel, in smart uniforms, march up to the gymnasium and return thence at their stated time. There is one coffee-house in the town, and I see one old gentleman goes to it. There are shops with no customers seemingly, and the lazy tradesmen look out of their little windows at the single stranger sauntering by. There is a stall with baskets of queer little black grapes and apples, and a pretty brisk trade with half a dozen urchins standing round. But, beyond this, there is scarce any talk or movement in the street. There's nobody at the bookshop. 'If you will have the goodness to come again in an hour' says the banker, with his mouth full of dinner at one o'clock, 'you can have the money.' The dull, quiet scene has an attraction for many, worn out by the 'storm and stress' of city life, although it must be confessed that few such can bear the monotony after

they have recuperated their health. Then they must rush back again to the whirl of life. Then they find themselves in accord with Dr. Johnson's dictum: 'Sir, when you have seen one green field, you have seen all green fields. I love to look upon the face of man: let us take a walk down Fleet Street.'

There is something more delectable, as a constancy, than either this village that Thackeray describes or the street that Dr. Johnson approves. The ancients hit it when they believed in *mediis tutissimus ibis*, that one should not go to extremes.

A spirit of cheerfulness has this, among other things, to recommend it, that it favors the digestive action. Nature has kindly conferred the boon that the functions of life which are necessary shall be at the same time pleasurable. The sense of taste ensures the enjoyment of a meal, and, if educated, has delicate appreciation of flavor. But there is a vast difference among human beings in this education and in capacity for education. The difference is well illustrated by an occurrence assigned half a century or more ago to the Military Academy at West Point, where a cadet was represented as passing his plate to his neighbor to be handed to the head of the table, accompanying it with the instruction, "Some chicken, please, dark meat, a little white, and a morsel of liver." His plate, reaching the second man to pass it, he said: "Oh, bother, big piece, anywhere!" If the table be approached with the spirit of cheerfulness, and its viands be consumed leisurely with pleasant talk, the digestive processes begin under the most favorable auspices. Eating, on the contrary, with haste, perhaps with more attention to a newspaper than to the meal, is most unfavorable to good digestion. Some persons are, it is true, compelled by force of circumstances to solitariness, but most persons are able to eat in company.

Digestibility is not always associated with nutritive value in a food. Some articles are comparatively innutritious, but are easily digested. They are not worth much for sustenance, but whatever there is in them can be easily appropriated by the

system. On the other hand, some articles which possess great nutritive value are comparatively difficult of digestion. The alimentary principles with which they abound are difficult for the digestive juices to extract. Proper preparation of food for the table is of the highest importance. To be digestible and palatable, most of the articles of food that we consume depend largely upon cookery. On account of the large amount of starch that vegetables contain, they should be thoroughly cooked, in order that the starch may burst through its cells and be fit for the action of the digestive fluids. The majority of meats are nutritious and digestible when boiled, stewed, broiled, or roasted. Baked and fried meats are more difficult of digestion. The cookery bane of America has been the frying of meat, most prevalent on farms. But people are learning that broiling makes meat not only more digestible than frying, but far more palatable.

It is not healthful to undertake great mental or physical exertion after a full meal. For this reason, a dinner-hour at the close of the day is preferable to one at noon. The system requires some sustenance in the middle of the day, but digestion should not be taxed at that time. A little luncheon is all-sufficient. After a hearty meal, both mind and body should be sluggish, because the nervous system is directed towards digestion, and the circulation has the same need. The function of digestion, in a word, is the chief bodily process at that time, and the nervous system cannot rightly spare force from it for other parts of the body. Drowsiness is natural after a hearty meal, and may be profitably indulged in by a short nap; digestion then proceeding without hindrance. Some people imagine that they must take a walk after a hearty meal, in order to shake off the feeling of lethargy, but this is an injurious practice. Great fatigue disturbs and delays the operations of the stomach. Positive exhaustion takes away the appetite, and in this condition one should not eat much. The lightest sort of supper before retiring predisposes to agreeable sleep. The prejudice

against late suppers arises from the fact that most persons then eat injudiciously as to quality and quantity of food. Unpleasant mental causes influence digestion unfavorably, just as cheerfulness influences it favorably. Melancholy, depression of spirits, anger, embarrass the function. The practice among the ancients of having music during meals was conducive to good digestion. In New York and Philadelphia, now, and in many other cities, the practice has been revived in some restaurants.

The flesh of very young animals is not so digestible as that of older animals, not distinctively old. Veal and lamb are not so digestible as are beef and mutton. The meat of really aged animals is tough, unpalatable, and indigestible. Pork is decidedly unwholesome in summer. Mutton is, for most persons, more digestible than beef. There are some persons, however, who cannot tolerate mutton. Bacon is better borne by the stomach than is fresh pork. Calves', or better still, sheep's liver, although a delicious dish when fried with thin slices of bacon, is too rich for some stomachs. The meat of chickens and turkeys is easier of digestion than is that of ducks and geese. Fish are nutritious and savory. Though possessing less nutritive value than meat, yet when properly cooked they admirably support life and furnish a most agreeable addition to the table. Salted, or salted and smoked, they are less digestible. Shell-fish, highly esteemed as they generally are as delicacies, are capable in some constitutions of giving rise to eruptions on the skin; and a diet which is exclusively of fish, whether fish or so-called shell-fish, leads to a most depraved condition of the skin and system generally. The outbreak of *beri-beri* in the Japanese navy is ascribed to too exclusive use of fish and rice as food. Raw oysters are among the most digestible things. Clams, also, when properly prepared, as soup, are very digestible. They should be chopped fine and passed through a hair-sieve, the hard, uncompromising particles being left behind. Soft-boiled eggs are generally well borne by delicate stomachs; it is very different with hard-boiled eggs. Yet there are persons with idiosyncrasy even as to soft-boiled eggs, that makes them unendurable as food.

Vegetables contain a smaller proportion of nitrogenous matter than that which is contained in meats. Wheat-bread is an article of universal consumption. Though less palatable when slightly stale, it is then more digestible than when fresh. Toasting increases its digestibility. Oatmeal is a valuable food prepared as porridge, and delicious when eaten with cream. An eruption of the skin has sometimes been attributed to oatmeal, but certainly it is not of ordinary occurrence. Indian corn contains a larger amount of fatty matter than do other grains. Rice is distinguished by the large amount of starch which it possesses. Peas and beans contain a large amount of albumen. Potatoes abound chiefly in starch, and, therefore, should be supplemented by other things at a meal. The sweet potato, boiled or roasted, is somewhat hard to digest. Carrots and turnips, extensively used in soups and stews, are acceptable to persons of good digestion. They, however, have but little nutritive value, containing a large proportion of water. Spinach is wholesome and easily digested. The onion is a valuable article of diet, although rather difficult of digestion. Celery, asparagus, and lettuce are wholesome and savory. Stewed tomatoes, especially if served with rice, make a very delicious dish. Of themselves, however, they are not very nutritious. Fruits, while not directly contributing very much nourishment, are beneficial, on account of the acids which they contain.

There are many persons who watch their sensations too attentively. By directing their thoughts too sedulously to the digestive organs, they invite to a greater degree the very troubles which they have in a small way, or perhaps not at all. The admirable provisions of nature have placed the circulation, the secretions, the movements and nervous supply of the digestive tract under the automatic superintendence of minor nerve-centers which act, to a certain extent, quite independently. These centers perform their duties most effectively when not too strictly watched. Anxious direction of thought to these functions disturbs their operation and may lead to hypochondriacal conditions.

Imperfect cookery is responsible for much indigestion. Hence the words of the proverb: "The devil sends the cook." If proper preparation of food be of importance to the healthy, how doubly important it must be to those who are dyspeptic. In many acute ailments, the temporary abstinence which loss of appetite involves is of advantage to the patient. In chronic affections, however, where the tendency is to gradually failing nutrition and wasting of the body, it is important that food be offered the patient in the most digestible and appetizing form. When the stomach is very weak, nourishment must be conveyed to it in the fluid or in the semi-fluid form. Animal food must be made into soups or broths. Milk is in many cases found to be a great dependence. It can be given alone, or, for the sake of variety, made into puddings with bread, rice, corn-starch, or tapioca. Much depends upon the manner in which food is served to invalids. Its attractive surroundings will often tempt where their absence leads to rejection of food. The neat service of a clean napkin spread on a little tray is very different from a naked tray, with perhaps heaped-up superfluity, instead of some dainty, tempting dish.

Some infectious diseases are disseminated by water, ice, and milk. Not long ago, a physician in London succeeded in tracing an outbreak of typhoid fever to the eating of infected ice-cream sold by Italian street peddlers. Some makers of ice-cream add to it gelatine, in order to prevent its melting rapidly. If this be pure no harm results. It has, however, been found that glue is sometimes employed as a substitute for gelatine. Now, as glue generally contains some chemical intended for a preservative, ice-cream in which it has been used is unfit to eat. Too much care cannot be taken in large cities to secure pure supplies of water, ice, cream, and milk.

CHAPTER XI.

EDUCATION OF THE BODY.

AMONG rude tribes, and, as well, among the civilized people of antiquity, the attributes most necessary, and most prized, were physical force and prowess. It was universally recognized that the stronger had a legitimate right over the weaker. This concession is constantly met with in ancient literature. Accordingly, members of the male sex were, from their earliest years, trained in gymnastic and martial exercises, through which they could acquire vigor, courage, and hardiness. These qualities were in those times absolutely essential to a people's security from slavery. Warfare, conquest, were regarded as the noblest occupations of life, the warrior, consequently, as the finest type of manhood. The arts of peace were regarded as merely contributory to the art of war. Competition among boys, youths, and men lent interest to athletic sports that were preparatory to military service.

During their palmy days, the ancient Greeks were renowned for their athletic contests, that gifted race systematically pursuing them in various forms. Living in a temperate climate, they brought corporal development in symmetry and strength to high excellence. The most noted of the localities in which games were celebrated was that at Olympia. These games were especially remarkable, not only on account of their magnificence, but from the fact that they were frequented by competitors coming from all the states of Greece. It is the strangest of all revivals in the history of the world, that the stadium at Athens in which the Athenian games took place has been restored on its old foundations. It was only Greeks who, in ancient times, had the privilege of engaging in these contests. Now they are open to competition from the whole world. The fourth series of this revival has just taken place, the United States athletic repre-

sentatives securing a much larger percentage of victories than those from any other people. The most signal success of any, however, was that of the Canadian who ran from the old battle-field of Marathon to the stadium at Athens, eclipsing all competition; not only is the run of about twenty-six miles prodigious, but its successful accomplishment in quick time has a sentimental value. When the Greeks won the celebrated battle of Marathon from the Persian King Darius, a fleet-footed messenger carried the news to Athens, and delivering his message, dropped dead.

In a very good illustrated article in the *American Review of Reviews* for July, 1906, entitled "American Athletics in Ancient Athens," Mr. James E. Sullivan gives an account of the Olympic games held in Athens for 1896. These games were held in Athens, in 1896; in Paris, in 1900; in St. Louis, in 1904; and again, at Athens, in 1906. London is now to have them. Mr. Sullivan gives two distances incorrectly. He gives fifteen hundred meters as the mile, and eight hundred meters as the half mile. But a mile is sixteen hundred and nine, plus meters, and consequently a half mile is eight hundred and four and a half, plus meters. The late Marathon-Athens race was won by Serring, of Canada. There had been seventy-seven entries for it, and the Greeks started in it with thirty-seven men. Americans won seventy-five and five-sixths points out of a possible one hundred in all the official games.

The account which Browning gives, in a note to his poem "Pheidippides," makes the feat of the original Greek courier who ran twenty-six and a tenth miles to Athens bearing the news of the Grecian victory at Marathon much greater than is generally believed. He says: "Pheidippides, when the Persians went up into Attica, ran all the way from Athens to Sparta to demand aid, and ran back again to be in time to be at Marathon; and then, the battle over, ran to Athens to announce the victory, falling dead, having done so." The last lines of "Pheidippides" are:—

“So is Pheidippides happy forever,—the noble strong man
Who could race like a god, bear the face of a god, whom a god
loved so well;
He saw the land saved, he had helped to save, and was suffered
to tell,
Such tidings, yet never decline, but gloriously as he began,
So to end gloriously—once to shout, thereafter to be mute:
Athens is saved!—Pheidippides dies in the shout for his meed.”

The battle of Marathon was one of the turning battles of the world. A previous attempt of the Persians to invade Greece had failed. On the occasion of the battle of Marathon, Datis and Artaphernes, two generals of King Darius, of Persia, concentrated their army at Marathon. The Athenians sent to the Spartans for assistance, but, owing to the moon not being, according to a superstition of the Spartans, in the right quarter for their starting on an expedition, they declined marching. The Athenians, nine thousand strong, were, on their way to the field, joined by the Platæans, one thousand strong. Miltiades was one of their ten generals. To him the Greek victory is ascribed. The Greeks charged the Persians in a general advance. Their center was broken, but their right and left wings, closing around the Persians, put them to rout with great slaughter.

The Greeks held the festival of the Olympic games every fifth year. For a month, all hostility among different states was suspended. The sports consisted, as now do those in imitation (with the exception of chariot-racing), of foot races, wrestling, leaping, boxing. The victors received nothing for prizes but branches of laurel. But nothing in all Greece gave a man so high a standing as to be a victor at Olympia. Returning, his fellow-citizens received him with an ovation, conferred on him the costliest gift, and he remained through life a man of the highest distinction. It was not unusual for a statue to be erected in his honor in his native place. The estimate in which the victors were held is shown by the way in which a Greek writer

speaks of one in connection with a Spartan general. The writer says that the general was decked with flowers as though he were an athlete. He is speaking, in this case, of Spartan athletes. These, he tells us, were, when victors, if they fell in battle, honored by games instituted in their memory, in which none but Spartans were allowed to contend.

The Olympic games lasted for nearly twelve centuries. In the times of Grecian independence, before the Greeks fell, through internal dissensions, before the Roman arms, they were of inestimable service in stimulating interest in the maintenance of a powerful and intrepid body of citizens. The benefit spread universally throughout the states of Greece. The youth of the whole people was in constant athletic exercise. Those who took part in the games were obliged, as already said, to be of Hellenic descent. But there was also another requirement, that they should be, in character, free of any political or religious stain. No social station was regarded so high as to debar a man from competing in these contests. Socrates, although high as a philosopher, was regardful of physical culture. His constitution, by nature robust, was reinforced by his habits of life. Upon several occasions he served as a soldier on the field of battle, and was praised for his endurance and courage. It is told of him that at the battle of Potidea he saved the life of the wounded Alcibiades.

The Romans, although greatly influenced in literature, taste, and philosophy by the Greeks, differed vastly from them in their views of public games. They considered it derogatory to appear at performances in the arena. It remained for a vain-glorious Roman Emperor, in the decadence of Rome, to make there a public exhibition of himself. The athletic exercises of the Romans, except the military ones, were taken in private. The public games of Rome were of the most brutal kind, the favorite show being that of gladiatorial contests, where, as Byron says, a man was "butchered to make a Roman holiday." During the decline of the Roman Empire the populace was so

lazy and degenerate that it found its chief pleasure in frequenting baths and plays. Barbarian vigor was called upon to support the tottering Empire, and the legions of Rome were recruited from the provinces. The barbarians, who from century to century attacked the vast and decaying Empire, were hardened by migration and warfare. The Goths, the Huns, and other invaders were invigorated by relentless energy of invasion. After the fall of the imperial city, Rome, society fell into a chaotic condition under the prevalent dominion of force.

As the germs of modern civilization gradually arose from the ruins of the old world, as feudalism and chivalry gradually developed, military service again became general among the most stable elements of the new order of things. The heavy accoutrements and armor of chivalry could not dispense with brawn and training if success were to be achieved upon the battle-field. Knights were constantly practiced in martial exercises. The tournaments which were held from time to time were contests in which a number of mounted knights joined in single combat or in *melée*. Jousts were displays of skill between two rival knights, and were of much more frequent occurrence than tournaments were. It was always the proper thing for champions to engage each other in combat upon the slightest pretence, the charms of their respective lady-loves, what not. The extravagance of their doings is portrayed by a master-hand in "Don Quixote." The most superb description of a tournament to be found in all literature is that of Sir Walter Scott, in his "Ivanhoe," of the field of *Ashby-de-la-Zouche*. Later, we have in the same volume his wonderful picture of the duel between Ivanhoe and the Knight Templar, Sir Brian de Bois-Guilbert, upon which was to depend, through appeal to heaven to sustain the right, the reputation of the lovely Jewess, Rebecca.

At last the introduction of gunpowder into warfare changed its whole character and the character of nations. No longer could aristocratic, mailed warriors, well mounted upon mailed steeds, ride down whole squadrons of unarmored foot-soldiers.

The light of democracy dawned upon the world, and infantry have been from that day to this the mainstay of armies. Then the strategical and tactical skill of leaders became of more importance than their individual strength and prowess. Athleticism fell into comparative neglect and disuse. Then, as now, in every country, avocations which are pursued in the open air were those that chiefly invigorated the body. Then, as now, the farmer, the soldier, the sailor, the policeman, and those persons engaged in the more laborious handicrafts were more distinctively than others men of muscle. The dwellers in cities, and especially those among them whose pursuits demanded but little bodily exertion, declined in physique. The transmission of this decline from generation to generation, the consequent increase of scrofula, consumption, and nervous diseases which prevailed, especially in large cities, at length produced the marked physical advantage of which we have known, of the country-bred over the city-bred nation, save among the city-bred whose worldly circumstances are such as to allow them yearly to avail themselves of a recreation which takes them beyond city bounds, and save, too, among that class which, large as it is, is still a small minority of people, who occupy houses and sometimes villas in the vicinity of cities, where they lead lives amidst pure air, and spend in the city only that portion of time which may be devoted to business or to pleasure. At the time, however, to which allusion was here first made, systematic exercise and gymnastics fell into neglect in Europe.

It is strange that Jean Jacques Rousseau, than whom no man was ever more full of vagaries, should have been among the first to call attention, in his work, "Emile," to this flagrant neglect of exercise. The most convincing demonstration of the value of gymnastics was soon afterwards given by Prussia, after her humiliation by Napoleon by his victory over her at Jena. Prussia established schools for physical exercise under the direction of experienced educators. They served to train the body in strength and skill, and developed a class of men who, at last, as

soldiers vindicated the honor of their country. Ever since that time athletic exercises have held a high place in the estimation of Prussia, and adoption of them has spread from that country to all parts of Germany. In time, the practice spread to other lands, including at last the United States. Now gymnasiums are attached to most of our large schools and to the higher seats of learning. The balance here may be swinging too far to the other side. Students, in some cases, devote a disproportionate part of their time to athletics. There are signs already, however, that the presiding powers of such institutions are recognizing the evil. Already the word has gone forth from them that athletics are primarily for the general body of students, not for the development of a small number of élite capable of making grand-stand plays before the world.

The English, constitutionally slow in adopting anything, took long to perceive the necessity of gymnastic courses of instruction. True, many of them are devoted to field sports and outdoor games, and nothing can be better than these for physical development; but these do not take in a whole nation; at most, those who can follow them are all but a privileged class. At one time, not long since, schoolboy sports were almost unknown even on the continent of Europe, the French boy particularly scarcely knowing anything of rough, boyish contests.

Children who are early driven by poverty to work, and the adult inhabitants of very large cities, have but little opportunity for outdoor exercise except in walking to and from the scene of their labors. Pedestrianism even now is largely neglected in the United States. Business men ride to their offices in the street-cars, reading the morning newspaper on the way. Shop-girls often live at so great a distance from the places where they work that the use of cars is with them a necessity. The fact is unfortunate. These girls especially need to draw fresh air into their lungs, instead of inhaling the impure air of crowded street-cars before and after they spend a day in the pent-up surroundings even of the best ventilated store. What a pity it is that all

the world has not at beck and call what is healthful and delightful. And yet, so irrationally are we constituted that there are thousands who could have this at their pleasure who do not take advantage of their freedom. Cowper, in two of his compositions, "The Winter Morning Walk" and "The Winter Walk at Noon," speaks charmingly of pedestrianism. Charles Dickens, a great pedestrian, who did not hesitate to walk many miles at a fast clip, writes thus of a winter walk: "Better than a gig! When were travellers by wheels and hoofs seen with such red-hot cheeks as those? When were they so good-humoredly and merrily bloused? When did their laughter ring upon the air as they turned them round, what time the stronger gusts came sweeping up; and, facing round again as they passed by, dashed on in such a glow of ruddy health as nothing could keep pace with but the high spirits it engendered? Better than the gig! Why, here *is* a man in a gig coming the same way now. Look at him as he passes his whip into his left hand, chafes his numbed fingers on his granite leg, and beats those marble toes of his upon the footboard. Ha, ha, ha! Who would exchange this rapid hurry of the blood for yonder stagnant misery, though its pace were twenty miles for one?"

It is quite customary among English professional men to spend their holidays in walking and climbing tours among mountains. Many a hard-worked London physician or lawyer recovers in a few days among the mountains, the tone of health which had been impaired by arduous labors in his daily round of life. The same advantage may be secured in many parts of our own country. A few hours' journey by rail will carry a traveler to a mountainous region where he may make his explorations afoot in search of pleasure and health. Delightful excursions may be made among the hills in the summer season. In its season, he may diversify his trip by trout-fishing in mountain streams. It is, however, only by accustoming himself, by easy degrees, to unwonted exercise, that the unused citizen beyond middle age can derive the indubitable benefit to be found in

exercise among the mountains. Not only, with due precaution, will his flabby muscles be made firm and strong, but his breathing power will be improved. Deep draughts of pure air are inhaled, the heart is invigorated, the action of the liver stimulated, and the blood purified. Appetite and digestion are improved, and nervous irritability subsides. The skin becomes clear and regains the bloom of health. The eyes become again lustrous from the potent rejuvenating influences at work. Dr. Hermann Weber, of London, states that mountain exercise has a beneficial influence even on the hair, and that the grayness of many persons in hair and beard has been diminished by a mountain tour.

This kind of exercise is highly beneficial to those persons who are strong in constitution but are run down in health from mental strain. Positive invalids should never resort to it. The exertion of tramping and climbing would prove to them quite injurious. In the early stages of consumption, when there has not been marked failure of digestion and general decline of health, such excursions, if prudently managed as to amount of exercise, may arrest the disease; but in its advanced stage, exertion at high elevations gives rise to haemorrhage and accelerates the progress of the disease. Speaking generally of walking, it should be said, that it is a common error to believe that walking before breakfast secures a good appetite; the reverse is more likely to be the case. What this volume teaches, among other things, is that the body is a machine. Being a machine, it needs to be supplied with fuel for work. If it be not supplied with fuel, it will take fuel from the body itself to support the deployment of muscular energy. After exertion, moreover, without food, the power of digestion is not so good as that which is usual in the particular individual who thus experiments upon himself.

To acquire and maintain health, no special apparatus is necessary for the majority of people. The exercise most readily at every one's disposition, or at almost every one's, is walking.

Those persons who have not been in the habit of walking, and those whose health is infirm, become fatigued in walking moderate distances; those who are robust and are habituated to walking can go many miles afoot without fatigue. Some thirty years ago, girls of society took it into their heads for the first time to go with parties of male escorts on long rambles in the country. It came to be a fad, and as it was pursued under the influence of sexual attraction, it was done entirely without discretion as to distance and speed in walking. It seemed to die at last a natural death from observation that the enthusiasts were doing themselves positive physical injury. Were the practice moderate, however, among members of both sexes, and among persons of all ages, we should hear less of loss of appetite, chronic dyspepsia, headache, neuralgia, depression of spirits, sleeplessness, and other ills which, if they do not positively keep people from their usual avocations, at least seriously impair energy, productive power, and social agreeableness. With the exception of avoidance of the direct rays of a powerful sun in midsummer, and searching blasts on a wintry day, when the thermometer is at its lowest, there is scarcely a time when a person could not be benefited in health and vigor by a lusty walk. Happily, there is now a steadily increasing appreciation among us of the value of exercise. In this country, in early times, the hardships of pioneer life, the activities of the chase, the frequent conflicts with Indians, gave a large amount of physical training to the male portion of its settlers. The rapid growth of large cities to which population seems unduly to tend, the entire removal of savagery in the remotest parts of the United States, the whole changed condition of the country, have had some effect upon the health and vigor of many of its inhabitants.

It is a conclusive commentary upon the inadequacy of life, except among the favored classes, to secure physical stamina, to find, as we do, that in lately recruiting for the British army, it has been found necessary to lower the standard of physical

development. The fact has awakened so much attention in England that attention has been given to gymnastic exercises among enlisted men. Mr. Maclaren, of Oxford, bears strong testimony to the value of these exercises. Of a number of non-commissioned officers sent to him to be trained as teachers for the British army, he says: "The muscular additions to the arms and shoulders and the expansion of the chest were so great as to have absolutely a ludicrous and embarrassing result, for, before the fourth month, several of the men could not get into their jackets and tunics without assistance, and when they had got them on, they could not get them to meet down the middle by a hand's breadth."

The relation between systematic physical exercise and health was perceived by the Greeks, and their most illustrious physicians habitually made use of gymnastics in the treatment of many chronic disorders. Knowledge of the relation has never since been entirely lost sight of, although in modern times, the medical profession has not employed this valuable method of exercise as much, perhaps, as it ought to have done. Gymnastics, in medicine, is a preventive rather than a curative method of treatment. It is better, of course, to preserve health than to be cured of illness. The utmost attention of scientific physicians is now engaged upon the problem of preventing the occurrence and the spread of disease. When the body is in full health, it offers vigorous resistance to the occurrence of disease. Were it not for this fact, human health and life would be more precarious than it actually is. Low organisms, called in general terms "microbes," are generating disease, that is, affording means to generate it, through their reception into the human system as well as into that of the brute creation. These disease germs are, with few exceptions, members of the vegetable kingdom. Like higher members of that kingdom, they require a certain kind of soil in which to develop their parasitic life. Healthy human tissues defend themselves by neutralizing the power of these germs, or by eliminating the poisonous products which

they create. Microbes, in themselves, are not dangerous. They are not dangerous as such. They cause disease because, in their rapid multiplication, they elaborate chemical substances, by-products; which are poisonous. These substances, reaching the blood, cause specific diseases. Their poisonous products may be regarded as analogous to those of the Jamestown weed (pronounced "jimson weed"). They contain an active poison which produces specific symptoms when introduced into the human body. The great problem before the science of medicine of to-day is, how, by what means, to render the human system insusceptible to infectious and contagious diseases.

The present prevalent recognition of the relation between health and exercise has led to many public institutions of learning having a medical man in charge of the hygienic and athletic conduct of the pupils. This control answers several purposes. Such a director, acquainted with human anatomy and human functions of the body, can, besides recommending all that appertains to ventilation, bathing, clothing, etc., so arrange for exercising, that different groups of muscles shall be symmetrically developed; so that, in the acquisition of strength, one part of the body shall not be sacrificed to another or others. This medical control is particularly valuable in schools for girls. A physician is competent to warn them against the dangers of over-exercise, and can render immediate assistance in case of injury. The excellent effect of athletic exercises upon girls is well illustrated by the statistics of Amherst College, where daily exercise is a part of the regular course, under the direction of a physician. Whereas the average annual loss of time from sickness is from nineteen to twenty days, these girls lose only about two and one-half days during the annual scholastic term.

Children should be indulged, so far as possible, with life in the open air from their earliest years. There are but few days in the course of a year when even infants are not better for being carried outdoors for a constitutional walk, trip in a baby-coach, or full-blown carriage drive. In winter, the warmest

part of the day should be chosen for their excursions; in summer, the coolest. In winter, the child should be wrapped up warmly; in summer, lightly clad. Issuing from the generally ill-ventilated houses of the poor, these excursions are, for babies, of inestimable value. Their blood is purified, and their resistant power to disease increased. A child thus accustomed from its earliest years to the open air is much less likely than others to be attacked by infantile disorders. Children thus treated acquire a hardiness which was, perhaps, somewhat lacking in their constitution. Children born to families in which there has been exhibited hereditary tendency to consumption particularly need this daily exposure to fresh air. As the children increase in age and learn to walk, the length of outing can be gradually increased.

Modern civilization and over-anxious care, especially among the well-to-do, have rendered early life in cities more precarious than it should be for children. Many mothers, taking natural pride and pleasure in seeing their little ones fond of reading at the earliest age, fall into the unfortunate practice of encouraging them in this direction for the purpose of keeping them out of what is called mischief, making sure of their not soiling their clothes, of not fighting with other children. Nature, however, has implanted in the male disposition, and only in lesser degree in the female one, love of activity in the open air. The danger of confinement to boys is less than to girls. Habits of staying within doors are soon learned by little girls, prompted by fear of soiling clothes and avoidance of rough play. They sit neatly dressed at parlor windows, gazing at the obstreperous life of other children. Many girls thus grow up in a little house, its shades well down for fear of light spoiling the colors of the carpet. Life for them goes on with a monotony which old and decrepit people can endure, and even like, but which, for them, is a distinct violation of the laws of nature. They grow up puny, pale, narrow-chested, delicate, and nervous. They all have feeble appetites and are more open to attack of disease than

are other children, and far less are they capable of resisting its consequences.

All city children should be allowed a reasonable degree of liberty for play in the open air; in the parks, if possible; if not in them, in the squares; and if not in them, play in the streets is better than none. So far as danger to life and limb in the streets is concerned, it may be said that, with proper cautionary instructions from elders, and with the experience which children soon acquire, there is but a small percentage of street accidents among them even in our largest cities. Speaking of the necessity of physical relaxation for school-girls, Professor Key, an eminent Swedish physician who has paid much attention to the health of school-children, writes: "The amount of work, sitting still, etc., exacted of the girl, is not consistent with her health during her growing time. Without going into particulars as to the influences injurious to the health of growing children, which proceed from their homes or may be brought out in connection with the school and school work, it is still manifest that the burden of work that children have to bear, under the present school regulations, far exceeds what is permissible, and is, to a large extent, responsible for the liability of school-children to illness."

It is important that gymnastic and calisthenic exercises should be made interesting. If little boys and girls are compelled at set hours to perform routine movements, a drill that does not require much attention or movement, the task, through becoming monotonous, is of comparatively little physical benefit. On the other hand, very complex exercises are not judicious instruction. A writer on the subject remarks: "It is obvious that difficult exercises cannot be recreative. It is not a relaxation that the brain of a child can find in these methodical exercises, but rather one lesson more added to so many others. Among the movements of our gymnastics, those which are not hard enough to discourage the child are so destitute of interest that they repel by their monotony To a pupil, pleasure is

not only a moral satisfaction, it is a hygienic element indispensable to his health. To impose on a child exercises in which he will find no pleasure is more than a want of solicitude—it is an offence against hygiene." Nothing can be less attractive than the scene of a gymnasium, with its various apparatus, looking like a place of torture and execution. All the more, therefore, should those in charge of it remember that it is not like the expanse of green fields or watery surface that incites to exercise in field-sports or boating, and for that reason should make what is to be done in it as interesting as limitations admit.

Gymnastic exercises for girls should be carried on only for the purpose of securing strength, and as a road to the province of health. It is not desirable, even if it were possible (and it is not), for young women to be able to rival their brothers in physical ability. It is not possible for them to walk so far, to run so swiftly, to throw heavy weights, to leap long distances, and to lift great iron masses. The perfect physical condition that belongs to their sex is very much less muscularly than these endowments. The moral side of the matter is that healthy girls make cheerful companions, good wives, and competent mothers.

At a recent French medical convention, Dr. Martin, of Bordeaux, read a memoir upon the influence of physical exercise in preventing short-sightedness in school-children. He called attention to the fact that the benefit of gymnastics extends to every portion of the body. Short-sightedness generally appears first between the ages of eight and twelve. Comparison of observations made in different countries demonstrates that the school work of children is the immediate cause of numerous cases of this defect of vision. Dr. Martin asserts that the study of the statistics, together with his personal investigations, has shown that one of the prime factors in the production of this affection is an insufficient attention to physical culture. This cause, it is almost needless to say, exists in too many schools, and especially in those devoted to the education

of girls. It has been found that short-sighted children are most numerous in those countries where the least number of hours are devoted to physical exercise. Moreover, the feebler the constitution of the child, the more liable it is to acquire short-sightedness. Dr. Martin would prefer that children should not be taught to read or write before the age of seven, and in this opinion he will be supported by the majority of physicians. Institutions for the education of children below that age should confine their instruction to physical culture and oral communication of instruction.

Boys and girls should, as soon as possible, be taught to swim. The exercise improves the lungs, strengthens the muscular system, and is the most pleasurable in existence. It is, besides, an accomplishment, and more than that too, in value, for through it there is a stronger hold on personal life and on the lives of others. To swim would be naturally possible to everyone, if everyone realized that the human body is lighter than water, and thereby possessed the confidence necessary to avoid false movements that prevent staying above its surface. The body is, as is said, lighter than water; but if a person who is no swimmer throws the arms and shoulders outside of it in frantic efforts to escape sinking, the parts left in the water are unequal to supporting those left unsubmerged, and the person sinks, taking water into the lungs. Confidence that the water will support the body is therefore the first requisite for the person wishing to learn to swim. It has happened occasionally, that some persons have, without previous experience, been endowed with this, have entered the water, and have swum with ease. There was a case of this many years ago, where a boy of seven years of age, entering the Delaware where it is narrow, many miles above Philadelphia, with his big brother alongside of him, suddenly struck out and with him swam across the river. As confidence is the first element in learning to swim, one cannot do, by way of acquiring it, better than to follow Dr. Franklin's instructions for learning to swim. He directs the

beginner to choose the clear water of a gently sloping beach to make the first essay. The beginner is to walk out until the water is breast-high on him, then face towards the shore, throw a glistening white pebble into the water a few paces ahead of him, and then plunge in head first and try to recover it. He will find so great a resistance of the water to his intention as is well calculated to give confidence in its capability to support the body. As the learner knows that his plunge is towards water shallower than that whence he starts, he is sure of incurring no risk, and he thus acquires knowledge in the simplest possible way as preliminary to his attempts at swimming. Soon he will learn with ease to float and swim. All persons cannot hope to reach perfection in the art. Length of limb and great muscularity are obvious conditions for success. But there is one which never seems to have been duly considered—relative specific gravity. Specific gravity is the relation of weight to bulk. The writer once knew a man who, from absence of adipose tissue and presence of dense muscular tissue, had so high a specific gravity that he could never make one of the best of swimmers except for short distances. Swimming has now become improved, through competition, to so high a degree of excellence, there are so many different kinds of strokes, that the subject cannot be entered upon in detail here. What is called the breast-stroke, in which both arms sweep symmetrically from the shoulders with the palms of the hands extended, is the invariable stroke for the beginner. Treading water, floating, hand-over-hand strokes and others come gradually to the assiduous swimmer.

Young people all have instinctive love for boating and sailing. The assumption is far too common among girls that every man can drive horses and sail a boat. The disasters from this conviction that ensue every year are numerous, especially in sailing. There is nothing that requires more experience than sailing. A man has been known to be sailing before the wind, with his boom well off, when he suddenly luffed into a creek and

knocked his girl companion overboard to drown by the gybing of his sail. The writer has seen drownings innumerable along the coast because the men in charge of boats did not see coming squalls, or did not know what to do when squalls struck. One might as well have a cow in the boat as an unskilled man in an emergency. With proper precautions, however, for sailing and rowing, there is no reason why girls should not take part in these sports. Canoeing had better be avoided by them, but they can properly indulge in rowing, even to the extent of taking an oar or a pair of sculls.

Fishing is a sport which has the sanction of both the lazy man and the philosopher. There are modes of it, however, that do not suit the supremely lazy man. Brook-trout fishing demands not only patience and skill, but considerable exertion. The antiquity of fishing is attested by a passage in the Book of Isaiah, where it says: "The fishes also shall mourn, and all they that cast angle into the brooks shall lament, and they that spread nets upon the water shall languish." The sport has the advantage of bringing one into close communication with the scenes of nature. No form of outdoor exercise is more enjoyed than this by its votaries. Many are the books that have been written concerning the pleasures and the art of angling. Izaak Walton's "Compleat Angler" has long been a classic in English literature. Even the celebrated scientist, Sir Humphrey Davy, found occupation in writing a book on the gentle art. Walton extols the sport in the following lines:—

"Let them that list, these pastimes still pursue,
And on such pleasing fancies feed their fill,
So I the fields and meadows green may view,
And daily, by fresh rivers, walk at will
Among the daisies and the violets blue,
Red hyacinth and yellow daffodil,
Purple narcissus, like the morning rays,
Pale gander-grass and azure culver-keys."

In winter frozen streams and ponds furnish opportunity for the very exhilarating exercise of skating. Good skaters can deploy upon fine ice of no great extension a great variety of movements. If a skater needs to try his speed, he can get many a stretch of a mile or more in length. An interesting and highly popular game on ice is derived from Scotland—that of “curling.” It has been introduced into Canada by Scotchmen and there warmly welcomed. A space of about forty yards long is marked out on the ice, having its goals, called “tees” at each end. The players are two or four on a side. Stones of from thirty-five to fifty pounds in weight, furnished with handles, are the projectiles used, two stones being allotted to each player. The object of each player is to hurl a stone over his opponent’s goal. A stone which is not sent with sufficient force to reach a certain line in the rink is counted out and removed. As stones gather near a tee, the strife concentrates, from the fact that the competitors endeavor to advance their missiles and to dislodge those of the opposite side. Roller-skating is also good exercise if indulged in moderately in the open air.

From time immemorial every race inhabiting northern countries has used the sled for passengers and for transportation of goods on snow or ice. The sled has always been a popular vehicle with boys for winter sport, and among young people of both sexes, for coasting on the snow down steep hills. This practice pursued without due precaution, with the great apparatus fondly called the “double-ripper,” has sometimes led to serious loss of life and many wounds among the occupants of a double sled. A very singular accident took place with a double-ripper some years ago. A jolly night party, on the machine, reached the foot of a hill at the height of their hilarity, when a vehicle turned suddenly into the end of the street down which the slide ran. There was no time or room for avoidance of collision. The legs of the steersman of the double-ripper ran through one of the wheels of the vehicle; the driver, not know-

ing in the darkness what was happening, whipped up his rearing horses, and the steersman of the double-ripper got off with his life, but with a compound comminuted fracture of one of his legs.

Of late years the "toboggan" has been introduced to some extent from Canada. The toboggan is simply a smoothed plank, not mounted on runners, and in consequence its employment involves much more bumping than does the use of the double-ripper. This amusement causes an active circulation and purification of the blood through the abundance of oxygen with which it becomes supplied. With proper precautions, the sport may be advantageously shared by girls. The choice of a safe place, free of the presence of trees, free of the presence of carriages and of travel of all sorts, skill in the steersman of the apparatus, are the only necessary prerequisites.

Sleigh-riding is a delightful pastime, always supposing that the wind is not blowing a gale, and that one is provided with plenty of fur robes for wraps. The atmosphere where dry snow covers the ground is very exhilarating, to which is added the exhilaration of speed, jingling sleigh-bells, and the gaiety of social enjoyment.

Running strengthens the legs, invigorates the heart, and increases the breathing capacity of the lungs. It should, however, be practiced with moderation, for, otherwise, the lungs and the spleen become engorged with blood, a stitch is felt in the left side, and a painful effort in breathing is experienced. The heart may be overworked, and severe and even fatal exhaustion may occur from running too fast or too far. It is a form of exercise especially appropriate to youthful lightness of body. Children, however, who have suffered from rheumatism, should not be allowed to run. Rheumatism sometimes causes disease of the heart, and if this has happened in any case, violent exercise is injurious. The enormously increased rapidity of the circulation produced by running puts an exceedingly great strain upon the heart, a strain which the organ in a weakened condition may

not be able to bear. For this reason, persons beyond middle age who have long ceased habitually to run, are injured by running, as they sometimes do, to catch a car or train. Running is an exercise of which boys are very fond, and it enters into many of their games. When one of them has been early used to running, it is astonishing what powers of speed and endurance can be cultivated in him. For short races, a quick start and swift pace are allowable, but for long distances, the pace held must, of necessity, be more moderate. Running with a steady stride, or with a "lope," Indian scouts and white couriers have sometimes covered long distances in an almost incredibly short space of time.

Wrestling, among the most ancient of sports, has steadily increased in favor in the United States for many years past. Gibbon, the historian, thus tells of the first appearance of Maximin, afterwards Roman Emperor: "About thirty-two years before that event, the Emperor Severus, returning from an Eastern expedition, halted in Thrace to celebrate with military games the birthday of his younger son, Gela. The country flocked in crowds to behold their sovereign, and a young barbarian, of gigantic stature, earnestly solicited in his rude dialect that he might be allowed to contend for the prize of wrestling. As the pride of discipline would have been disgraced in the overthrow of a Roman soldier by a Thracian peasant, he was matched with the stoutest followers of the camp, sixteen of whom he successively laid on the ground. His victory was rewarded by some trifling gifts and a permission to enlist in the troops. The next day the happy barbarian was distinguished above a crowd of recruits, dancing and exulting after the fashion of his country. As soon as he perceived that he had attracted the Emperor's notice, he instantly ran up to his horse and followed him on foot, without the least appearance of fatigue, in a long and rapid canter. 'Thracian,' said Severus, with astonishment, 'art thou disposed to wrestle after thy race?' 'Most willingly, sir,' replied the unwearied youth; and almost in a

breath overthrew seven of the strongest soldiers in the army. A gold collar was the prize of his matchless vigor and activity, and he was immediately appointed to serve in the horseguards who always attended on the person of the sovereign." But thousands of years before the time described, wrestling had been an institution among the remotest people of antiquity, knowledge of whom has come down to us.

There is no pleasanter outdoor sport than quoits if, at disposal, the quoits themselves are neatly, not clumsily made, the soil is adapted to their resting well when thrown, and the place where they are played is in windless, pleasant shade. The game strengthens the wrists and exercises the faculty of judgment of distance. The occasional stoop to pick up the quoits at the goal at which they have been thrown lends suppleness to the body.

Archery is one of the most elegant of sports, and has been moderately revived within a few years. It is elegant, because the arrow can be made to hit the target with great precision, the correct posture of the archer is fine, and all the details about the bow, from the yew of its wood to the treatment and care of its string, are of the most refined sort. There is, especially among men of Anglo-Saxon race, a great deal of sentiment about the bow. Skill in archery was once upon a time the pride of England, when by its means she won famous battles. Since 1844 the sport has become increasingly popular. It cultivates grace and strengthens the muscles of the arms and chest, developing capacity for judgment of distance and effects of light and shade and wind. Nothing can be more charming, too, than a scene of archery on the greensward, surrounded by groves, and embellished with the movements of members of both sexes gaily apparelled and moving or standing posed in groups, or as single figures shooting at the targets of the field. An able English advocate of the sport, Mr. Horace A. Ford, says that "there is no exercise more healthy or more rational, or which returns more true and genuine qualification to the man

who practices it." He adds that, "as an exercise for ladies, it is advantageous from the fact of its being general and equal without being violent—calling the faculties, both of mind and body, into gentle and healthful play, yet oppressing none—withal most elegant and graceful." George Eliot mentions the gracefulness of the archer where she says: "Who can deny that bows and arrows are among the prettiest weapons in the world for feminine forms to play with? They prompt attitudes full of grace and power, where that fine concentration of energy seen in all marksmanship is freed from associations of bloodshed." Bows for women's use are made lighter and somewhat shorter than those for men, with arrows proportionately shorter. The tremendous power with which an arrow can be shot from a bow used to be illustrated in the buffalo (bison) hunts of North American Indians. Riding up swiftly to close range with one of these animals, an Indian would bury his arrow to its feather in the body of the game.

Croquet and lawn-tennis are games sufficiently mild to be played with pleasure and advantage in our summer season. But even they are too strenuous when the quicksilver of the thermometer ranges near ninety degrees.

In this country, the so-called American game of base-ball, which is really a development of the game of town-ball which we inherited from the English, has become, in its professional and some other ranks, a pastime attended with considerable risk, the damage of sprains and dislocations, and even of an occasional death. The hardness of the balls, the force with which they are pitched and batted, bring it about that not even the partial armor worn by the catcher or the swiftness of foot of the runner can guarantee them against injury. The spectacle of the base-ball field with two fine teams pitted against one another is the most popular of any in America, so far as numerical attendance can witness to the supposition. It may be, however, that the higher prices charged for entrance to a first-rate game of college foot-ball give undue prominence to popular

love of base-ball. Foot-ball, as now scientifically played, whether in America or England, develops strength, skill, and courage in the course of the training indispensable to prominence in the sport. The eager rivalry among teams led at last to an amount of brutality in its conduct that has called for and been answered by some tentative measures for amelioration of the severity of the game.

The game of golf, once peculiar to Scotland, has now been largely adopted in the United States. The field should be of stubby grass, thrown up here and there into little hillocks, known in the language of the game as "hazards," which are to be avoided. A "round" of holes of about four inches in width, and of slight depth, is dug in the ground from one hundred to three hundred yards apart. The aim consists in seeking to drive a ball, with clubs variously shaped as to their ends, into these holes, with the fewest number of strokes. From six to twelve differently pointed kinds of clubs are used for the exigencies of position on the ground, players being accompanied by attendant-boys known as "caddies," to serve, at a moment's notice, the particular kind of club needed. The game is suitable for persons of all ages and of both sexes. Its need it skill rather than strength, although the possession of a certain fair amount of strength is indispensable.

Bicycling, which began with sudden and enormous public favor, fell as rapidly into disuse. The fact is one of the most surprising among human vagaries. The exercise brings into action the muscles of the trunk of the body and its lower limbs. It takes the riders generally into the country air. Considering that it stimulates the action of the lungs, and therefore exercises beneficial influence on the composition of the blood, and has all the pleasurable accompaniment that can attend any exercise, it is a pity that it should have been so generally relinquished, for it increases not only active circulation, but promotes also the secretions of the body and improves the appetite and digestion. In the case of persons spare in flesh, it increases weight, while

on the other hand, it is excellent for reducing corpulence. The exercise, moreover, constitutes an admirable education of the senses in judgment of speed, distance, and readiness of action. The exact balance of the body, the brisk movement, the pure air, the pleasing scenes through which the rider may pass, excite cheerful thought. The sport may confidently be recommended to those who suffer from dyspepsia, gout, rheumatism, nervousness, and to those who are threatened with consumption. As every practice may be abused, it may be well to add that riders should not throw themselves forward on the bicycle-seat. Backward projection of the spinal column and stoop-shouldered positions are not associated with the full benefit of any exercise. Before bicycling came to an abrupt stop, what was recognized as "the bicycle stoop" was known by all scientific men to be injurious. The rider should sit easily erect, and thus present an appearance, not only of good athletic knowledge, but of graceful pose.

Horseback exercise is an excellent preservative of health, and one of the most delightful in sensation of any in existence. By it, the circulation is stimulated, the breathing deepened, the action of various glands, especially that of the liver, promoted, the appetite and digestion improved. Besides all this, the acquisition of the art of horsemanship is valuable training of skill and courage, and full of exquisite pleasure of being in touch with a docile and intelligent animal. It is an old-time homely saying, that "the outside of a horse is good for the inside of a man." It is an exercise appropriate to almost every age and to either sex. Children learn the art of riding with the greatest ease. In fact, the best riders are always those who have acquired the art in early youth. Persons who spend most of their lives in sedentary occupations find in horseback riding one of the most charming diversions. Of all delightful experiences of it the first, by all odds, is where a party of ladies and gentlemen form a cavalcade, and as the cool of the afternoon approaches, on a summer's day, or earlier on an autumn one, when

leaves are falling, start forth together for a ten-mile ramble at walk, trot, canter, gallop, through the wood-roads and open lands of a beautiful country whose landscape is ever changing to their view as they ride on pleasantly with the clatter of hoofs, whinnying horses, and pleasant conversation.

Polo has been introduced into this country from India. The participants in the game, mounted on ponies, vary from three to six on a side. Each player has a stick four feet long with a cross-piece at the end. The object is to drive the ball through the goal of the opponents. Each goal is eight yards in width, and the two goals not less than two hundred and fifty yards apart. To begin, each side is stationed behind its goal-posts. One player of each side acts as goal-keeper. At a signal, every player strives to drive the ball towards his opponent's goal. A game lasts for an hour and ten minutes, with an interval of five minutes after each twenty minutes of play.

Coaching, in the primitive condition of the United States, when it was the chief mode of traveling, was at the same time a delightful pastime. Men still living remember with pleasure the delights of a two-days trip in frosty weather, and even when snow covered the ground, when they used to find helpful and pleasant companionship, stop at the end of a stage at a country inn, drink a glass of hot whisky-punch, and all in a glow resume their seats with continued animation and enjoyment. The present renewal of coaching in a fashionable form has none of the old romantic elements which formerly belonged to that mode of travel. It is a pinchbeck imitation of the real thing, without a spice of the various elements that made old-time coaching so charming—the queer people one met, the queer scenes one saw, the bustle, the whole business of that special phase of life. One cannot wonder that Dickens and Thackeray, fondly recalling the old-fashioned stage-coach of England, should have sung its praises with enthusiasm. In Dickens's "Martin Chuzzlewit," Tom Pinch journeys to London. Thus the spirited description of that trip goes: The coachman "did things with his hat

which nothing but an unlimited knowledge of horses and the wildest freedom of the road could ever have made him perfect in The guard, too! Seventy breezy miles a day were written in his very whiskers. His manners were a canter; his conversation a round-trot. He was a fast coach upon a down-hill turnpike road; he was all pace. A wagon couldn't have moved slowly with that guard and his key-bugle on top of it." In Dickens's "Tale of Two Cities" a night journey from London to Dover is sketched. Dickens says: "The Dover mail was in its usual genial position, that the guard suspected the passengers, the passengers suspected one another and the guard; they all suspected everybody else, and the coachman was sure of nothing but the horses; as to which cattle he could with a clear conscience have taken his oath on the two Testaments, that they were not fit for the journey." This refers to the times when highwaymen still infested the roads. Thackeray, in his very last, but unfinished work, tells of a little boy who shot a highwayman in the face.

Some of the exercises discussed develop strength rather than grace. They are, however, the basis of grace. They harmonize the muscular system, through establishment of the nervous system. Some exercises are from their character especially promotive of grace. The poet was right when he said they move easiest who have learned to dance. The bulky athlete is at a disadvantage in a ball-room in the matter of grace unless he has learned to dance. Movements of grace are more curved and rhythmical than other movements are. The music that accompanies dancing ensures their being rhythmical, and their curvilinear character is promoted by the motions necessary to performing the steps of the dance. It is not to be expected that a man's movements shall be so graceful as those that are possible to a well-formed woman, for the reason that her anatomical structure prescribes to her movements more curvilinear lines than a man's does.

Athletics have a good effect upon disposition and mental

faculties. Among the Romans was realized the advantage of the *mens sana in corpore sano*, the healthy mind in the healthy body. As a general rule, strong men are of equable disposition. Aware of their powers, they are not generally prone to offence and picking quarrels. Mental power is undoubtedly increased by physical exercise. This has been conclusively proved by investigation among large bodies of students in many colleges. It is only a false seeming, generally, when this looks untrue. The boy who loves active exertion, the student of more advanced years, may sometimes too much neglect his studies in favor of his athletic predilections, and thus show for a time at a disadvantage. But many is the case which life witnesses where the close student seems to have left in himself no reserve for life, and the formerly apparently unstudious and neglectful youth eventually comes to the front with a spirit for acquisition of knowledge that never abates. Enthusiasts in athletics generally have that cast of mind which inclines them to active rather than to contemplative life. It comes about that the student may need to be driven to the gymnasium, and the gymnast to his books. The same person is rarely equally at home in both spheres. The qualities acquired by athleticism are developed by physical exercise, not in the class-room. With these qualities, the athlete does not lack determination and patience for the acquisition of knowledge to stand him in stead for active life.

There is one exercise which is important to every young man of condition, that which is known as the art of self-defence—boxing. As the possession of the young man of condition, it is not in danger of becoming the art of aggression, to which low level it falls in the hands of the rowdy, from whom, through life, at any moment, he may be called upon to defend himself or others by his skill. Police protection is not always at hand to succor persons of either sex insulted or assaulted by the human brute. There is nothing more delightful than to see such an one, confident in his strength and ferocity, polished off by a gentlemanly, skilled antagonist.

Fencing, too, is an art which every gentleman and woman should, if possible, acquire. Many cases have been known where it, like boxing, proved of signal service against unwarranted aggression. A man skilled in fencing or single-stick is not at a disadvantage if he has nothing but a cane or a folded umbrella to defend himself and injure his adversary. Fencing with masks, foils, and padded breastplates, is a perfectly safe amusement, and cultivates grace, quickness of hand, and agility on the feet. The calf of the left leg is the only part that becomes unduly enlarged from the exercise. This is because the right leg is the one that is advanced in the attitude of fencing, its foot resting lightly on the ground, ready to retreat or press forward in the encounter, while the left leg bears most of the weight of the body, and the brunt of its increase when it recoils or retreats. A persistent fencer, in the times when small-clothes were worn (sometimes called knee-breeches), had the calf of his left leg so much increased beyond the size of the right one, that he was obliged to wear inside the stocking of the right leg a little pad to make the two calves symmetrical. This same gentleman, who had been a West Pointer in his youth, was one of two chosen from among the cadets to exhibit, on the occasion of a visit by the President, the expertness of the Military Academy's best fencing. The night before the encounter, of which he had been notified that he would be one of the principals, he had the horrible dream that, in the exhibition, his foil had broken off short, and that he had stabbed his opponent to the heart. Sure enough, next day, in the height of the encounter, it broke in the middle, but the rest of the dream did not come true. Had it done so, it would have gone on record, as many coincidences do, as following a revelation; although, when nothing happens, the record, as far as it has gone, is generally forgotten.

Unless the features are malformed, or unless they exhibit signs of dissipation, a man's expression is always passable. It is chiefly requisite that he shall look, as a man, manly. Beauty

of feature seems almost incompatible with manly expression. Beauty of form in man is another matter, and with that he is endowed, in his type, as sumptuously as is woman in hers. Something effeminate lurks in the countenance of a man whose features are moulded with extreme precision. With him, as to bodily form, the highest attributes of it should represent agility and strength.

The prime object of physical education for the female sex is the promotion of health and grace. As has been previously remarked, the possession by it of great strength is not desirable, nor possible. Its exercises should be in the form of calisthenics, the mild form of gymnastics. Numerous movements have been devised by which Indian clubs and wands can be used to great advantage; nor should it be debarred from taking in a lighter form some of the exercises for which the gymnasium has been instituted for the opposite sex. Members of the female sex should daily walk, almost irrespectively of the condition of the weather. A light fall of snow should be no obstacle to their taking this kind of exercise. Persons brought up with this kind of regimen rarely take cold. Colds are generally caught in the house from draughts; and susceptibility to them is always increased by living in impure air.

A system of calisthenics has, of late years, been introduced, known as the "Delsarte movements." Many women and girls in this country have attended classes in which this method was taught and have received distinct benefit from it. The aim of the system, however, is not principally for the improvement of health, but for that of grace. It is impossible, however, that in following it, the exercises should not be promotive of health. The inspiration that led to the invention of the system was artistic. The Delsartian exercises are but a portion of a doctrine relating to art.

Francois Delsarte was a musician, a teacher of oratory and music, in Paris. He had originally contemplated going upon the operatic stage, but, owing to some impairment in his voice,

was obliged to relinquish that ambition. As an instructor, he concerned himself in the production and management of the voice of his pupils. In the course of this, his mind was led from consideration of the physical to the intellectual and moral phases of the subject. He thought that a pure, melodious voice for singing or speaking is not enough for artistic requirement. Tone and modulation, he thought, must be superadded in order fully to express thought and emotion. Gestures, too, were used by him to express mental states. The association of emotion and certain muscular movements (gestures, in a word) received great attention from him. Himself endowed with histrionic talent, and constantly engaged in training pupils for the stage, Delsarte was, of course, well fitted for an instructor in gesticulation. He was constantly engaged in tracing the connection between thought or emotion and muscular movement. In this attempt he reached a number of conclusions which he believed to be fundamental laws. With this aspect of his studies we have here nothing practically to do. It is mentioned parenthetically as one of possible interest to the reader. Whether his views are of value in instructing in oratory and music can be decided only by persons conversant with those arts.

The calisthenic system taught under the name of "Delsarte movements" consists of a variety of motions of a rhythmical sort, by which the joints and muscles of the body are systematically brought into play. The system has, as its basis, a sort of drill, which may or may not be executed to the accompaniment of music. The muscles governing the action of the hands, wrists, elbows, shoulders, and the corresponding portions of the legs, the trunk of the body and the neck, are all exercised. Such motions necessarily promote flexibility, grace, and strength of the parts, and are therefore conducive to health.

It is the pampered kind of people, who live in warmed, stuffy rooms, take little exercise, hug the fire, cannot go out unless the weather is fine, live in dread of a draught, who are those that take cold, and with all their coddling of themselves,

may be said to lead a miserable existence. Their blood is always charged with impurities, their appetite and digestion and themselves are weak. They suffer from neuralgia and a host of real and imaginary physical ills. An accidental exposure to the weather, of such persons, is often followed by some ailment, and is taken as proof positive that their indoor habits had been imprudently violated. The fact is that those habits should be thrown aside. The valetudinarians should be driven or coaxed into the open air, where plenty of oxygen can be breathed, or else chronic invalidism will be the consequence of their cherished ways of life, a drooping, neutral condition of existence fatal to their personal enjoyment and to the comfort of all around them. Ailments which in the beginning are simply indicative of depressed vitality may gradually develop into organic disease; that is, into maladies affecting more or less alteration in the structure of organs of the body.

A formidable array of ailments can, in many cases, be avoided by judicious physical training. If a child, for instance, early in life manifests delicacy of constitution, or comes of a stock in which rickets, scrofula, consumption, or some other form of general disease is prevalent, there is every reason that his or her physical training should receive prompt attention. Care should be devoted at once by parents or guardians, through physicians, to such weaklings. Judicious methods may improve the tissues, strengthen the constitution, and prolong life. When strength declines without the presence of any apparent specific disease, when the appetite grows feeble, and the cheeks pale it is time to begin a course of exercises; not exercise in an inclosed space, but, best of all, in fresh air and sunshine.

One of the most satisfactory kinds of mild exercise is dancing. Of course it can be made violent and be prolonged to exhaustion, but it can also be made, with intervals of rest, and with easy movements, as little strenuous as any exercise can possibly be. This exercise is at the same time an art and an amusement. It has prevailed from the earliest times of which

we have any account in history, been cultivated by all peoples, civilized, barbarous, and savage. Conducted, as it is among civilized nations of modern times, with the accompaniment of music, it makes a graceful spectacle and forms one of the chief attractions of parties for the youth of both sexes. When indulged in with proper precautions against fatigue and against taking cold when overheated, it is an admirable exercise, promotive not only of muscular improvement and grace of bearing, but of high animal enjoyment. Those, however, known to have weakness or disease of the heart should scrupulously avoid dancing.

The male portion of country people, who till the ground, rarely need special exercise. With their women folks it is very different. It is notorious that, if they do not need exercise, their lives, as mistresses of farm-houses, are not led in a way conducive to health. The chief cause of this is the unsanitary way in which most farm-houses are closed against sun and air. There is another reason, too, for the conspicuous difference in health between the farmer's wife and the farmer and his children. The wife leads, as compared with them, a life of great monotony. Sunday is the husband's entire holiday; but the farmer and his children also have constant outing; the farmer in his trips to market and the country store, and in his cultivation of the farm and chores about its buildings; the children in their walks to and from school and in pleasant intercourse with playfellows. There is not on earth a more imprisoned being who is innocent than the average farmer's wife.

A remarkable instance of the effect of systematic muscular training has been exhibited in the person of the celebrated Sandow. This man, a native of Prussia, came of a family which had not been noted for great physical development. Until a few years ago, Sandow was rather slight in figure. At about that time he began exercising with five-pound dumbbells. The method that he adopted for exercise consisted of his endeavor to obtain control in increasing the strength of certain

groups of muscles. Following this, he subjected his body to various forms of exercise, by which not only were the parts selected for improvement benefited, but his whole body was necessarily increased in strength. He became able to perform extraordinary feats, raising for example, with one arm above his head, a weight of three hundred and five pounds. Recumbent, he supported upon his chest and knees a platform upon which three trained horses stood, the whole weight supported being twenty-eight hundred pounds.

The physical history of Dr. Winship illustrates the evil effects of overtraining. He was, as a young man, of very delicate physique, and with the notion of improving his constitution, took systematic exercise. In consequence, he gradually developed astonishing muscular strength in himself. He went from one extreme to its opposite, from weakness to strength, and died in the prime of life. But that, of itself, means nothing; it is not significant of the fact that he was injured by his extreme exercise. What does show it conclusively, however, is that on a certain evening when he was exhibiting on the stage his wonderful physical powers, he fainted on account of the closeness of the room. He had, in fact, sapped his vitality by excessive exercise. It is a very common but a very erroneous belief, that great muscular development must be indicative of health. But a man may be, and often is, muscularly strong, but organically weak. Now, suppose that a man is, by constitution, organically weak, undue amount of exercise makes him organically weaker. The huge muscles which he produces by exercise are nourished by blood at the expense of his feeble power to generate it to the full extent of their needs. Even if an athlete of the sturdiest frame and best possible organic development be concerned, if addicted to excessive exercise, professionally or otherwise, over a long course of years, his vitality is being lowered all the time. No finer athlete ever lived than Leon Javelli, who belonged to the celebrated French troupe of vaude-villists and acrobats, known as the Ravel; but the skin of his

face was tightly drawn on it, and his expression in later years was that of a death's head.

Excessive gymnastics sometimes injuriously affect the abdominal cavity. The intestinal tube is loosely attached to the lower part of the spinal column by a broad membrane which serves to support its blood-vessels and nerves, and allows some latitude of motion. In the walls of the abdomen are left, in the development of the child before birth, several openings for the passage of special structures. These openings are later partially closed and protected, but by a more delicate tissue than that which forms the chief part of the abdominal wall. This structure prevents protrusion of the bowel under ordinary circumstances; while it protects the contents of the openings from compression. But violent muscular exertion compresses the comparatively soft walls of the abdomen, as a consequence of which a loop of the bowel may be forced into and through one of the openings. This condition is known popularly as *rupture*, in medical language as *hernia*, and is dangerous. The protruded part of the bowel must be returned to its habitual position and a mechanical appliance, called a truss, be worn for an indefinite time, with the object of supporting the weakened opening or preventing recurrence of the injury, and in the hope of finally causing return of the distended opening to its original dimensions. More and more of the bowel may be forced through the membrane described; in some stress—it may be in the act of coughing—is caught so firmly that its circulation is impeded. The almost inevitable result of this, unless relief is obtained through a surgical operation, is a lingering death accompanied with great suffering.

It occasionally happens, even in the case of a strong and healthy person, that a bone is broken by the force of muscular contraction. Examples of this kind are occasionally met with by surgeons in persons engaged in performing feats of strength. In some instances, the sufferers have been noted for strength of a high order. In others, age, or some antecedent and perhaps

unsuspected disease of the bone, or general weakness of the system, has weakened the power of the body's resistance and made it unfit to resist violence.

The human organism was made for activity, and only in activity can it find its highest development; but its energy must not be severely or too continuously sustained. After work should come repose. The waste of tissue which exercise occasions can be replaced by other tissue only if a sufficient amount of rest be allowed. During sleep, the regeneration of the body proceeds uninterruptedly; without sleep it cannot take place, except in a relatively moderate degree. Rest, whether walking or sleeping, is indispensable to its restoration. Being only partial while waking, sleeplessness—what is called insomnia—means, when continuous, death. The heart is popularly believed to know no rest. It is true that the requirement of life renders its constant action indispensable, but it has instants of rest between its pulsations, and during sleep its movements become much slower than those in the waking state.

The beauty of the complexion depends upon the various conditions previously recited. Upon no one of them does it depend more than upon exercise. Active circulation of pure blood communicates a charming color to the cheeks, a bloom additionally attractive because it fluctuates with the emotions. If, as may happen, an actually rosy tint is not communicated to the face by exercise, the color is far removed from the palleness and sometimes pallor which indicate feeble health, if not disease. The hue of the skin is better distinguished when regarding it from so short a distance that its translucence permits the color conveyed by blood and veins to be clearly discerned. A skin in perfect health is able thoroughly to perform its functions. Just enough fatty substance is elaborated to keep its tissue soft and pliable, and to assist the nutrition of the hair. The perspiration is normally secreted, neither deficient nor superabundant. Assiduous attention, therefore, to the laws of health, involving all that is here descanted upon, confers upon

a person closely following them, among other things, the boon of a pure skin, fine complexion, with well-colored and lustrous hair.

The most important muscular structure of the body is the heart. This organ, which may be improved in its rhythmical function of effecting the circulation of the blood, may be much injured valvularly, and by inordinate enlargement, if athletic exercise be carried beyond the bounds of which an individual constitution is capable. When the heart is abnormally increased in size, it occasions much annoyance by its powerful thumping against the inner walls of the chest, the face becomes flushed from slight exertion, and the sufferer has headache and dizziness. The outlets of the two cavities of the heart, by which they communicate with each other, with the lungs, and with the arterial system, are guarded by valves. These valves may be aptly compared to sluice-gates which permit the passage of blood in its proper direction, but which prevent its backward flow. As soon as the blood is thrown from the heart into the great blood-vessel which starts from it, the valves close and prevent any return of the current. By this mechanism, the two cavities of the organ are allowed to fill. When it is expelled from one of them by contraction, the current cannot flow backward into the one from which it was received, or into the other from which it was ejected. This beautiful mechanism ensures against undue accumulation of blood in the heart, the lungs, or in any of the other organs of the body. Certain fluctuations in intensity, dependent upon the influence of the nervous system, occur without detriment, but if too frequently or intensely, are injurious. When the current through the heart is partially interrupted, a series of distressing symptoms ensues. These increase slowly but surely, and medical assistance, at its utmost, is able only to delay the progress of the disordered mechanism. The course of the disease pursues its steady way to fatal termination. Although sudden death from unusual strain upon the powers of the heart does sometimes occur, it is less common than is popularly supposed.

The valves of the heart, the important structures upon which so much of the safety and comfort of life depend, are very smooth, thin, and delicate, yet strong bands of tissue. They are so formed as to be able to bear considerable pressure of the blood with impunity, yet the sudden exertion of unusual force may overcome the resistance of one of these leaflets, may prevent it from exactly closing at the right time, and may initiate the series of changes to which allusion has just been made.

There is another kind of injury besides that mentioned, which excessive action of the heart may occasion. After the lungs have received their blood and converted it from venous into arterial blood, they send it to the more powerful of the two chambers of the heart for distribution to the entire body. From this chamber of the heart, the great artery, the main artery, as it might be called, receives the blood, and from its arch-like course gives off, at the base of the neck, branches which supply with blood the head, neck, and upper limbs. The beginning of this great artery, the part in immediate connection with the heart, receives at each beat of that organ, the shock of the column of blood which issues from the distributing cavity of the heart. The wall of this great artery is very distensible and very elastic, in order that it may at first yield to the impetus of the current and then contract. After being dilated by the rush of blood from the heart, its elasticity restores it to its usual caliber. It can readily be understood, however, that the wall of an artery may be overstretched and its elasticity thereby destroyed. This condition causes, in the first place, a certain imperfection in circulation. But, as time goes on, the habitual dilatation of the artery at that point beyond its proper size is followed by decreased nutrition of its wall, and eventually by an actual chemical and physical alteration in its tissue. It is no longer able satisfactorily to perform its function. It cannot react against the impact of blood, it becomes more and more dilated, and is converted into a bulging and pulsating tumor in connection with the lower part of the great artery. This process

has gone on insidiously down to a certain point when difficulty in breathing, alteration of the voice, pain, and other symptoms of the disease manifest themselves, according in intensity with the position and size of the tumor and the parts upon which it exerts pressure. Excessive exercise may have an injurious effect upon the lungs. The practice of athletics expands the chest. This enlargement of the thoracic cavity is accompanied by a corresponding expansion of the lungs. Students who have, during their college course, devoted themselves enthusiastically to athletics, are necessarily obliged, when they enter upon their life-work, to relinquish to a great extent systematic physical exercise. They soon cease to experience the original full effect of their previous training of muscles and may then, unless on their guard against relinquishing it entirely, fall an easier prey to the effect of discontinuance, than those who had not so assiduously enlarged their muscles.

Some sports entail a certain degree of deformity if care be not taken to avoid it. The bicyclist's stoop has been already noticed here. Undue exercise in the mild game of lawn-tennis may produce disability of the elbow. An affection of the knee-joint is sometimes brought about by playing foot-ball. "Tennis-elbow," "foot-ball knee," "base-ball fingers," are now recognized crippled conditions. No sport should be carried so far as to entail the slightest deformity or inconvenience.

Gratifying results are often obtained in the case of consumption by gentle exercise, especially exercise of the lungs. Deep and slow inhalations of the breath, performed through the nose and in the open air, accompanied by movements of the arms from the sides to a horizontal position, and then carried above the head, are valuable exercises, on account of their causing penetration of air to the deeper portions of the lungs and promoting the removal of stagnation there. This exercise is injudicious, however, when consumption is advanced, when hectic fever and night-sweats are present. Elocution and singing are also beneficial as exercises for the lungs. They compel

the action of deep breathing, and therefore strengthen the muscles by which respiration is accomplished. The mere expansion of the chest, with corresponding inhalation of fresh air, promotes the health of the lungs and that of the whole body. This is one of the modes by which physical culture obstructs the development of consumption.

Massage rouses into activity the functions of the skin, increasing the perspiration and the sebaceous secretion, and promoting respiration through the instrumentality of the skin itself. It restores the vigor of the muscular system when that has been fatigued or is weakened by disease. Observe how sedulously athletes of all kinds, runners, walkers, jumpers, boxers, get "rubbed down," as they call it, after every great exertion. As the invalid gains in strength as he convalesces, it is a great advantage to him if he combine movements with the passive exercise of massage. This is effected by offering a certain amount of resistance to the operator's strength. In fact, the practice is what is known as the Swedish movement cure. The exercise, passive and active, as thus combined, exerts a favorable influence upon the circulation, and upon the composition and distribution of the blood, promoting the nutrition of the whole nervous system. Massage is an excellent treatment for pimples, greasy skin, tetter, and other affections. It is useful in muscular rheumatism, neuralgia, and other affections of the nervous system; for enlarged glands, anæmia, disorders of the stomach, and of the liver and bowels. In many forms of disease of the joints it is of more value than any other treatment.

Differences exist among different races in height, weight, and muscular development. Rude tribes, constantly active in the open air, as the Zulus, for instance, are endowed, as a general rule, with greater agility and strength than persons who dwell in cities. Nevertheless, cultivation of the muscles in cities may be made to compensate for unfavorable surroundings. The trained athlete of the city may possess greater agility, strength, and endurance than does any laborer. From the exhibition that

soldiers of the Civil War gave as to their endurance, and from the supremacy in feats of agility and strength by American athletes in the Olympic games of the last few years, we may consider it as established that, from a combination of causes—constitution, climate, food, training—the United States is endowed in its inhabitants with the finest physical representatives of the human race. The climate and topography of the country vary greatly in different parts of the United States. The conditions of the surface are sometimes hills, mountains, plains, low-lying marshy ground; the atmosphere varies to a certain degree correspondently with these different situations, but any great differences among the people generally are more attributable to habits of life than to locality.

Faulty methods of physical education are largely responsible everywhere for physical and intellectual inferiority. The question of health is the widest of any in importance; without health, life is not worth living. The same measures whereby the health and beauty of the skin, the expression and vivacity of the countenance are secured, are those which promote health, strength, and every sort of efficiency; in fact the latter come first in the order of natural precedence and demand for consideration. Secure health, through all the various means which are here defined, and its embellishments in beauty follow. They come as a necessary consequence, in the material as in the spiritual world: “Seek ye first the Kingdom of God; and all these things shall be added unto you.”

CHAPTER XII.

CULTIVATION OF THE MIND.

IN the early years of life, beginning just beyond infancy, attention should first be directed to the development of the body. The child's mind is sufficiently engaged with interest in the strange world in which it finds itself, and in thinking and questioning about its marvels. This was, and still is, the most rational and universal course as an educational method, naturally prevalent in ancient as well as in modern times. Nothing is more short-sighted than to deny to children this sort of culture by indifference to their desire for information or by abruptness in imparting it. The course, although unsystematic as education, is, nevertheless, the one most natural and appropriate for early years. If a child's efforts at thinking correctly upon the basis of information imparted, if its curiosity be stimulated by successful endeavor to obtain knowledge, it enters upon the high road of education. Modern systems of education are laudably endeavoring to utilize this important method of instruction, formerly devolving entirely upon parents and elders generally. The study of books may be advantageously deferred to the period when application, with growth, becomes a natural impulse of the mind. Boys and girls who have an innate fondness for books will not, in due time, require encouragement to study them for both instruction and amusement. Every one knows, we see it around us every day, that they will even surmount difficulties in order to gain possession of books, some loving to read better than to play. But, looking to the future, recognizing that nothing in the world, no position, wealth, or learning can compensate for the loss of health, such children should rather be gently restrained than allowed or incited to read.

Children are generally interested and acute observers. It should be the aim of parents and teachers to encourage in them

the spirit of inquiry, instead of gruffly discouraging it, as sometimes happens. Conversation, including questions and answers, is, even with many men and women, the chief source from which they obtain knowledge. Information thus obtained is not so exact, so thorough and systematic as that gained from books, but it is at least vastly improving, through the interchange of thought. We have, in modern times, come to rely so greatly upon books for information, that the beautiful arts of conversation and letter-writing, once so prevalent among the higher ranks of society, have almost disappeared.

By older children the tasks of the school-room may be undertaken. It will be found that the boy or girl who has secured a well-developed body will usually display a power of patient application and concentration of mind which are excellent auguries of success in life. An acquaintance of a superficial sort with many books is not the most conducive to knowledge. The memoirs of some of the most remarkable men that have ever lived show that the absorption of knowledge from a few works of sterling character has often been the foundation of an extraordinarily eventful enlightenment of mind.

There is a tendency which those who have the care of the education of youth should oppose. It is the placing of undue estimate upon the cultivation of the memory. Memory is the basis of all mental action. If it were not for the collocation of facts by the memory, no rational judgment could be formed, no action taken. But memory is not mind itself, and though there have been persons of great mind who had wonderful memories, there are many persons who have wonderful memories with very little mind. The writer once knew a gentleman who had such a memory, but who confessed to him that he could not reach a conclusion on any subject. However indispensable some degree of memory may be, it is a less important faculty than judgment. The ability to recognize the relative weight of facts constitutes the highest attribute of the mind. Hence it is that the legal profession is regarded as the highest which can engage

the study of any man. Education is the training of intellectual and moral faculties native to the mind. Knowledge is the incidental acquirement in the process of education. The highest education is that which produces in the individual his highest capacity of reasoning. Everyone must, to some extent, think, but only he is truly educated, who constantly perceives, effectively, beyond the capacity of the uneducated, the operation of cause and effect in the small and great things of experience. He who does not at least endeavor to do so is a puppet, pulled to action by the whims of other men's opinions. No process, of course, can evolve what does not exist, in at least germ form, in the mind, but if the germ there exists, education is the only means by which it can be developed. A man may, however, become a mere storehouse of information without acquiring, through education, wisdom. Cowper expresses this truth in his "Task":

"Knowledge and wisdom, far from being one,
Have oftentimes no connection. Knowledge dwells
In heads replete with thoughts of other men;
Wisdom, in minds attentive to their own.
Knowledge, a rude, unprofitable mass,
The mere materials with which wisdom builds,
Till smoothed and squared and fitted to its place,
Does but encumber whom it seems t' enrich.
Knowledge is proud that he has learned so much;
Wisdom is humble that he knows no more."

Knowledge relating to an indiscriminate quantity of subjects, superficially studied, is of little value and soon forgotten. This is one of the observations that has led to the proverbial belief that the head boy at school is rarely heard of in after-life. The form of instruction, until quite recently, lent itself readily to the success of any boy at school, even if a dull plodder, if he would devote himself to memorizing much that he did not really absorb intellectually.

The object of education, therefore, is less to convey know-

ledge than to train the various faculties of the mind so as to make them useful instruments to their possessor. School and college are preparatory to the business of life, and should be the basis of professional or other training. Many of the facts there learned must eventually be nearly or quite forgotten, but a general recollection of the main facts of history, literature, science, will always remain, and with them the effect of training on the mental powers. A young man of eighteen or twenty years of age has generally discovered in what direction his bent and aptitudes lie. If he feels a strong inclination towards a particular pursuit he should at once concentrate his energies upon the special training needful for that work.

At the present day the whole field of knowledge has become too vast to be cultivated by any mind. It has become necessary for every one to devote himself to some special field of knowledge, and desirable that he should encompass this with as much general knowledge as he can acquire without interference with the first. In fact, general knowledge is the best basis for any special requirement, and to provide that is the function of school and college. When a man becomes engaged in the practice of any profession, manufacture, or mercantile pursuit, he has scanty leisure to study anything which has not some relation to his daily duties. He should, however, whenever possible, take pains to inform himself on subjects as wide as the poles asunder from his own pursuits. Only upon the terms of his so doing, to the extent of his opportunity, can he ensure himself against being intellectually narrow. A large part of the education of all of us is acquired unsystematically. A student with exceptional gifts sometimes neglects branches of his college course for the sake of an intellectual pursuit that may not be in the curriculum of the college he attends. The father of the distinguished orientalist, Klaproth, was an eminent chemist, who wished that his son also should devote himself to that science. The taste of the boy, however, set too strongly in the direction of the study of Eastern lands. At fourteen years of age he began

secretly to study the Chinese language. So rapid was his progress that five years later he began to publish writings on the subject of Asiatic languages and was appointed to an official position at St. Petersburg. The young Goethe was sent to Leipzig and Strasburg to study law, but gave himself up to literature, science, and philosophy. Such powerful impulses as have actuated these, and such as these individuals, affect, it is true, only those of uncommon mould. In less degree, however, any youth who has a particular leaning in intellectual pursuits will soon display the turn of his mind by the choice of the studies which he makes. He is unfortunate whose tastes have too wide a range. His danger is that, in attempting to cover too wide a field, or going over it most superficially, he will fail to make any solid acquirement.

Some persons early indicate decided inclination towards the study of history, languages, or literature. On account of inferior health, Gibbon, the historian, was at first very irregular in his studies. He had read with avidity many books when he arrived at Oxford in his fifteenth year with, to use his own words, "a stock of information which might have puzzled a doctor, and a degree of ignorance of which a school-boy might be ashamed." The turn of Macaulay's mind was so early manifested that, before he was eight years old, he had written a compendium of universal history, and soon afterwards began to compose verse. Pope "lisped in numbers and the numbers came." He began to put his thoughts into verse before he was nine years of age. Thomas Chatterton, dead at eighteen, left poetical compositions that secure his name from oblivion. Unmistakable evidence of artistic talent was given in tender years by Raphael, Titian, Dürer, Millais, Turner, and many others who subsequently rose to fame. Mozart, Beethoven, Meyerbeer, Mendelssohn, were mere children when their musical performances challenged universal admiration. W. R. Hamilton early showed love for study of language and mathematics. Dr. Thomas Young was almost equally celebrated in the diverse

spheres of physics and Egyptology. The aptitude of Pascal, in boyhood, for mathematics and mechanics was remarkable. It is unnecessary further to cite examples of early revelation of talent for particular directions. It is rare that, even without talent, capacity for doing certain things and not doing others, does not early manifest itself. Waste of time and energy results from pursuing wrong directions. Individual predilection and capacity are the only true guides for special endeavor.

Study of the classical languages and literature affords excellent mental discipline. The same object is accomplished by the cultivation of modern languages, mathematics, and physics. It is not necessary, however, to adopt one course entirely to the exclusion of the other. If one wishes to have what is called a practical education, or that is his need, let him by all means take it, but he will be all the better equipped for life, and especially for the years before the close of life, by possessing some education in what are the elegancies of literature and learning, the so-called "humanities." Ample knowledge, however, of history and of ancient literature can be acquired from translations printed in the mother-tongue. If one understands nothing of Latin or Greek, he loses one of the enjoyments of life; which is not fatal to comfort, but is only so much that is pleasurable omitted from his existence. The modern system in our best institutions recognizes the advantage of elective studies, and although the privilege is sometimes abused by students seeking the easiest lines of effort, yet, on the whole, it has proved of great advantage. No matter what may have been the extent of preliminary study, great or small, every man will find, upon entering upon life, that in proportion to its extent it is advantageous.

One cannot be too insistent in admonishing parents and guardians not to be too zealous in spurring on very young children to supremacy in school tasks. However rapid acquisition of facts may be, the gain is very dearly purchased at the expense of health and vigor. The boy or girl of inquiring mind,

naturally fond of books, needs no stimulus, and should rather be held back than encouraged to perpetual diligence. When studious tastes are early manifested, parents and guardians should, on the contrary, take particular care to promote the physical welfare of such youthful possessors of them. Such scholars are too apt to neglect exercise in play, not from indifference to it, but from their absorption in reading. The majority of young people, however, fortunately for themselves, have no such inclination. But almost without exception children have a passion for listening to stories, and will sacrifice playtime for the sake of them. Once, at a large institution where the boys had a couple of play hours after dark, the prefect of the younger branch of the boarding-school was found to have a great talent for story-telling. Whether or not he was actuated by desire to keep them out of mischief, however actuated, the fact is that night after night the majority of the boys swarmed around his desk in the study-room where they had already been at their lessons for two hours, continuously fascinated by the prefect's story, to be continued the next evening, consisting of weird adventures from which they could not tear themselves away even for playtime. Very little children will listen with absorbed attention to a tale, read or told, that they have heard a hundred times. A judicious parent or teacher, aware of this propensity, can, without sacrificing exercise to story-telling, advance from the purely imaginative to the instructive sort of story. A great desire of knowledge can be communicated in this way by encouraging the questions that are sure to arise from the performance. Information secured in the form of a task is much less interesting to childhood than that conveyed by the voice, coupled with questions and answers. If we go back to the time of the Greek philosophers and their pupils, we find them giving and receiving information precisely in that way. The conversational method of education has another advantage over that of regular tasks. The quicker intelligences among the scholars assist the teacher in conveying information to the

slower ones. The brighter stimulate and inform the duller minds.

A mischievous practice has grown up of late years in this country, of letting young children have evening dancing parties, to go through all the forms of entertainments of grown-up people. This kind of excitement is good for neither the body nor the mind of children. The immature nervous systems of the little ones are all alert and upon a strain. They go home to think and chatter about the evening's entertainment, and fall into light and unrefreshing sleep. Simplicity of life is the highest boon for children. A child should be a real child, not a little man or woman. It is unkind, to say the least, to abet precocious social education. A children's fashionable party is a very pretty spectacle, but it is one purchased at too dear a rate. An old-fashioned party, with simple games and early hours, is the only kind that is advantageous. Children are adepts at amusing themselves, and it is much better that they should be left to their simple modes and plays, than be led to ape the conduct of their elders. The heavier penalty falls upon the weaker sex. "The little ladies" are precociously stimulated, intellectually and emotionally. What is more attractive than an artless child? The world will soon enough rob it of its illusions. Leave children as long as possible to their natural plays. A fresh, hearty, innocent little boy or girl is a refreshing sight. A conspicuous case that led to disaster, through folly, was one where parental pride early launched a young thing into the social whirl. She was pretty, vain, tireless in amusement. Years rolled by, late hours, crowded ball-rooms, robbed her figure of grace and her cheeks of bloom. At forty years of age she is now plain, peevish, unmarried, sacrificed in health and looks for nothing. Such rapid decay of all pleasing physical attributes is not uncommon among the wretchedly poor; it is rare, however, among those in easy circumstances, as is this victim of early dissipation. Here is a woman by it transformed, in progress from youth to middle-age, from a beauty to a positively plain, forbidding woman.

Exposure, hard work, and generally hard contact with the world give the abjectly poor an appearance of age beyond their true years. The offspring of the rich may attend "children's balls," but the boys and girls of the poor must go to work. Their native innocence sometimes protects them from a knowledge of wickedness that surrounds them, but their eyes are soon opened. Ghastly acquaintance with the seamy side of life comes early to children of the very poor.

The establishment of manual training-schools in connection with our public school system is a step in the right direction for education. In these institutions, dexterity in the execution of fine mechanical work is taught, and the connection between conception and execution is established on a firm foundation. The mechanical arts stand in close relation to science. Lads whose tastes incline more to the mechanical than to other lines of endeavor and to the artistic rather than the scientific, receive much benefit from attendance upon these schools. Not only do they introduce scholars to the world of science, but to the world of art. Plastic art, like science, requires manual skill in its followers. Manual training-schools therefore place their scholars favorably to become engineers, architects, physicians, or scientists pure and simple. These schools, therefore, present the opportunity for specialization upon the basis of some slight preliminary education; and beyond, make natural introductions to the final occupation of life. What their scholars want to know and are instructed in are the various practices that will further their intentions in life.

Philadelphia possesses, in the Drexel Institute of Art, Science, and Industry, founded in 1891 by the late Anthony J. Drexel, an admirable training-school. Its object is the extension and improvement of industrial education as a means of opening wider and better avenues of employment to young men and women. In accordance with the founder's desire, however, the intention of the institution has been made more comprehensive, providing liberal means of culture by lectures, evening

classes, library, and museum. The organization embraces thirteen departments: the art, the science, the business, the mechanic arts, the technical, the domestic science, the domestic economy, the physical training, the normal department for the training of teachers, the department of lectures and evening classes, the library, the reading-room, and the museum.

The museum contains industrial art productions in textiles, fabrics, embroideries, ceramics, carvings in wood and ivory, metal work, etc. The library contains ten thousand volumes. The reading-room is supplied with a hundred periodicals, literary, scientific, artistic, and technical. The auditorium seats fifteen hundred persons, contains a grand organ, and is used as an assembly-room for lectures and for concerts given by the institution. Another lecture hall has seats for three hundred students. It is chiefly used for lectures on science. On the third and fourth floors of the institute are lecture and assembly-rooms connected with different departments. The galleries of these floors are decorated with Indian textiles, ancient etchings and engravings, etc. The fourth floor contains a gymnasium, bath-rooms, studios, etc. In the basement are rooms for electrical and mechanical laboratories and workshops. Concerts of good music are frequently given in the auditorium. Students have the option of taking such groups of studies or such single arranged courses as they may wish to pursue. The body of instructors consists of professors, teachers, and lecturers. At the very opening of the institute, in 1892-3, sixteen hundred students were enrolled in the various departments, elective courses, and special classes. Chicago has an institution, founded by Mr. Philip D. Armour, similar to the Drexel Institute.

The widest culture is, of course, possible only to superior gifts of mind, health, leisure, and ample means in the form of money. But restricted as it is numerically among mankind, it is this kind which gives us the results of scientific research and of every kind of human endeavor. One man may spend his whole life, many men have done so, in the study of entomology,

insect-life; and much as he may learn about insects, much still remains to discover. Bees have been studied over a longer period of time than have been any other insect, and scientifically, too, at the present day, and yet there are mysteries about the life of bees that still remain unsolved. Sir John Lubbock has devoted lately, for several years, great attention to earth-worms, resulting in the important discovery that they remove millions of tons of earth, and add, by their action, fertility to the ground. Men such as this one, working in different limited spheres, obtain an accuracy of knowledge about the subjects to which they devote themselves which is wholly unprecedented, and which, in the aggregate, is necessarily enormous; and it is through this favored class that the world generally receives its highest education. So, we have reason to say that this class has good right to exist as main contributors to the sum of human knowledge and well-being.

The study of medicine, founded as it is upon an exact knowledge of anatomy and the functions of the animal body, naturally leads the thoughts of a student of it to anthropology, geology, zoology, botany, and chemistry. We owe much to the labors of medical men. Speaking first with reference to the city of Philadelphia, with whose medical history the writer is more intimately acquainted than with that of any other, he may be allowed to cite a few cases in point. The labors of Professor Joseph Leidy, student and demonstrator of human and comparative anatomy, ranged over a wide field, and were, at the same time, so close, that no manifestation of nature was below his attention. He wrote upon the structure and development of the human race, the extinct animal forms of our Northwestern States and Territories, and upon animal and vegetable parasites that infest animal bodies. The Academy of Natural Sciences of Philadelphia owes much to the labors of physicians of the city. Many physicians of Philadelphia, while engaged in the practice of their profession, paid attention to some special branch of natural history. Professor Joseph

Pancoast, renowned for his operative skill in surgery, was interested in the study of various forms of animate and inanimate nature. This is true also of Professor Samuel D. Gross, long a colleague of Professor Pancoast's in Jefferson Medical College. Devoted to the practice of surgery, he was profoundly interested in lower animal life, and unwearied in its study. The late Professor William Pepper, provost of the University of Pennsylvania, directed the many-sided development of that institution of learning. Dr. S. Weir Mitchell, famous as a specialist in nervous diseases, still in practice, attracts patients from all parts of our own and foreign lands. He has closely studied the chemical nature and the effects of poisons, performing a number of dangerous experiments while examining into the subject of the poison of the rattle-snake.

The life of the Scotch physician, John Hunter, born in 1728, affords an example of how much can be accomplished by concentration of the mental faculties upon subjects which interest them and with which they are fitted to deal. He had no academical education. His youth, devoted to country sports, secured for him the robust health which served him in good stead through life. His labors were always directed towards some specific end. This, in connection with the talent of the man, accounts for his wonderful fruitfulness in discovery. He studied the habits of bees. He became proficient in human anatomy. He took up surgery. His researches extended to the lower animals, of which he gradually collected a large and valuable museum of various forms. His cultivation of physiology was fruitful in discovery. His labors revolutionized surgery. Among his pupils were Jenner, the discoverer of vaccination, Abernethy, and Sir Astley Cooper, the great London surgeons of that time, and Dr. Philip Syng Physick, the eminent surgeon of Philadelphia.

With men of a certain kind of mind and temperament, difficulty stimulates effort. Labor and perseverance become with them habitual. The necessity of economizing time establishes

with them system, and forbids the formation of evil associations and habits, so that what the superficial observer has sometimes thought to be their waste of talent and time turns out to be crowned with perfect success. The duties of the working lad preserve his strength. His short hours for study are prized. Since manual occupations give freedom of mind, there is time for reflection. Benjamin Franklin affords an example of triumphant self-education under difficulties. A native of one of Great Britain's colonies in America, he had access to but few books. From those, however, he studied so well as to absorb their instruction thoroughly. His youthful mind was nourished upon Bunyan, Locke, Addison, and other great writers, and in his delightful autobiography he tells how the pleasure he derived from the style of "The Spectator" inspired him with the useful practice of reading one of its papers attentively and then, after an interval of time, endeavoring to reproduce its language. While a lad he contributed anonymous articles to his brother's newspaper, in Boston, which were ascribed to the foremost men in town. He cultivated his bodily powers at the same time with such success that, in London, he excelled his fellow-printer craftsmen in strength, and was so expert a swimmer that he was solicited to become a teacher of the art of swimming. Returning from London to Philadelphia, he finally succeeded in establishing himself in the printer's business, which he conducted so successfully that he was able, in his prime, to withdraw partially from it, while receiving a handsome income from it for fifteen years. The numerous institutions which he either founded or fostered attest to this day the prodigality of his interest in human welfare.

The life of Michael Faraday is encouraging to those who begin with few advantages. The son of a blacksmith, he was, in his youth, apprenticed to a bookbinder. So decided was his inclination towards chemistry that, at the age of twenty-two, he became, upon the recommendation of Sir Humphrey Davy, an assistant in the laboratory of the Royal Institution. Subse-

quently advanced there to the position of professor of chemistry, he remained attached to the institution for fifty-four years. During his life he made a profound study of electricity, and will always be known as a great contributor to its science.

In the broadest sense, we are all educated by the circumstances of our lives, combined with our capacity and industry. The highest achievements of the schools can do no more than give the training of exact thought. The man who looks below the mere surface of the material or immaterial agencies with which he works, who really thinks, who schools himself, in all science or art, to look backward from effect to cause, is the being who advances his own interests and those of his kind. Such men are never satisfied that improvement and even great discovery do not constantly await that kind of thought which is allied with persistent work. Comparatively few of mankind are those who have the mind and the industry conjoined, that enable one who is so endowed to collate and classify all facts obtained by study, so that they shall throw light upon one another. For youth, it is generally best that it shall not be diverted from prescribed studies; after that, the mind should be allowed a freer range in which originality may, if present, assert itself. The inordinate multiplication of books in the present condition of our civilization may be a disadvantage to a youth, certainly will be, if he reads indiscriminately all of them that fall in his way. A mere bookish man wanders from one theme to another, acquiring a great amount of desultory information for which the memory affords no permanent hive. George Eliot gives us, in "Middlemarch," a sketch of this kind of person. She says that he was "noted in the country as a man of profound learning, understood for many years to be engaged in a great work concerning religious history. His very name carried an impressiveness hardly to be measured without a precise chronology of scholarship." This gentleman had been for years laboriously collecting materials for a "Key to all Mythology," but, George Eliot says, "was continually losing himself in labyrinths of unfruitful

speculation among small closets and winding-stairs, and in an agitated dimness about the Cabeiri, or in an episode of other mythologists' ill-considered parallels, easily lost sight of any purpose which had prompted him to his labors. With his taper stuck before him, he forgot the absence of windows, and in bitter manuscript remarks on other men's notions about the solar deities, he had become indifferent to the sunlight." This citation is of a case, not of desultory reading, but of reading to worse than no purpose; so that, if ill-pursued studies on a single theme may be followed by such results, what is not possible when they are pursued on many themes? The mind becomes a rag-bag of information capable of affording nothing in production but a crazy-quilt of information.

Children who spend too much time at their books often begin to complain of headache. This symptom denotes that the brain is suffering from the comparatively impure blood which it is receiving, and from the fatigue caused by its being kept too long in action. A radical change in the child's habits should at once be made; it should be sent out of doors to exercise in play. Corporal training is too important to be neglected. The basis of physical powers can be secured only in youth. There must always come a time when man or woman is brought to realize that a too free indulgence in reading has been purchased at too high a price.

Knowledge is real only when it has become an integral part of our minds, when it is so intimately blended with experience that forgetfulness is impossible. Every one possesses a greater or less degree of such knowledge. We cannot, for instance, forget the multiplication table; transactions of daily life keep it firmly in memory. The physician and surgeon cannot forget the situation of the different organs of the body, or the positions of the blood-vessels and nerves; constant reference to them makes them familiar. The attorney cannot forget the fundamental principles and many of the acts which constitute law. So we may say of all professions, that their members

have an ineradicable memory for certain things. For a contrary reason, one may read a multitude of books, but only those which have been the subject of real thought, thought which masters the subject, impress themselves so deeply as to make a permanent possession of the mind.

Only the substance of those sterling works which have the impress of thought remains permanently in the memory. A young, versatile person is always in danger of accumulating, from indiscriminate reading, a quantity of unassimilated matter. If this be a danger, unless the authors be well chosen, even in the case of works dealing with serious subjects, what may not be the consequence of taking at random those of the imagination, whose number at the present time is legion, among which miscellaneous array are to be found works of talent and genius and others of the veriest trash, giving the most false idea of the world in spheres intellectual and moral? It is a great advantage in early life to have some well-educated senior at hand to point the way that leads to instruction and delight, and put a sign forbidding entrance upon literary paths that lead nowhere in information or literary charm. Some years ago some boys were found gloating over the papers of a trashy weekly publication. The monitor, who happened to be near, and interested in their welfare, instead of denouncing such literature and putting a stop to their reading it, soon thereafter picked up a number of the weekly, and reading it aloud to one of the boys, interspersed his comments in the story. This he did to such good effect that the boy was never again seen to relish the contents of the weekly, soon thereafter took a different direction in his reading, and is now a writer of considerable reputation.

The imagination, no less than other faculties of the mind, requires restraint and cultivation. Even in matters of science, the mind is not productive to the highest degree without imagination. But, unless curbed, it is like a runaway horse that may carry the rider to injury and even to destruction. Well trained by observation and reflection, engendering moderation in its

flights, and with good taste, imagination has created some of the finest monuments in the literature produced by talent and genius. The art of literary expression, consisting of the arrangement of materials (what is called construction), the manner in which conceptions are wedded to words, the grace with which those words are presented in sentences (producing what is known as style), together form, to the acute reader, a pleasure of a sort which has been in all times the solace of intelligent and educated mankind, the delight of youth from its earliest years, and the resource of age in its calm, decrepitude, or sorrow. A work of art in literature quickens the emotion and refines the mind in the same manner as does the sight of a fine painting or statue, a great musical composition, or, mayhap, a noble edifice.

Fiction includes all works in which imagination literally takes the leading part—romances, novels, poems, plays, and such works as the “Arabian Nights” and “Vathek.” But, whereas in the “Arabian Nights” and “Vathek” and such works, the fiction is not pinioned by fact, because in these the supernal and unknown enter; in the case of poems, their aim is to present the highest truths; in that of novels and plays, theirs to be exactly representative of lesser truths, to hold the mirror up to daily nature; and it is only in the case of romances that a middle ground appears, on which there are found neither exact truths nor, on the other hand, their entire absence.

Love of fiction is natural and well-nigh universal. The best authors afford knowledge of phases of society with which we are not personally familiar, or present us with pictures so faithful to life of those with which we are most familiar, as to give us, in enjoying them, not less pleasure. In a sketch by Dr. John Brown, of Edinburgh, entitled “Thackeray’s Literary Career,” he says: “Perhaps more remarkable than even his invention, is the fidelity with which the conception of his characters is preserved. This never fails. They seem to act, as it were, of themselves. The author, having once projected them, appears to have nothing more to do with them. They act somehow

according to their own natures, unprompted by him and beyond his control. He tells us this himself in one of those delightful and most characteristic ‘Roundabout Papers,’ which are far too much and too generally undervalued.” In one of his “Roundabout Papers” Thackeray writes: “Novels are sweets. All people with healthy literary appetites love them,—almost all women,—a vast number of clever, hard-headed men. Why, one of the most learned physicians in England said to me only yesterday: ‘I have just read so-and-so for the second time’ (naming one of Jones’s exquisite fictions). Judges, bishops, chancellors, mathematicians are notorious novel-readers; as well as young boys and sweet girls and their kind, tender mothers. Who has not read about Eldon, and how he cried over novels every night when he was not at whist? And pray, what is the moral of this apologue? The moral I take to be this: The appetite for novels, extending to the end of the world; far away in the frozen deep, the sailors reading them to one another during the endless night; far away under the Syrian stars, the solemn sheiks and elders harkening to the poet as he recites his tales; far away in the Indian camps, where the soldiers listened to ——’s tales or ——’s, after the hot day’s march; far away in little Chur yonder, where the lazy boy pours over the fond volume and drinks it in with all his eyes; the demand being what we know it is, the merchant must supply it, as he will supply saddles and pale ale for Bombay or Calcutta.

“But, as surely as the cadet drinks too much pale ale, it will disagree with him; and so surely, dear youth, will too much novels cloy on thee. I wonder, do novel writers themselves read many novels? If you go into Gunter’s, you don’t see those charming young ladies (to whom I present my most respectful compliments) eating tarts and ices, but at the proper eventide they have good, plain, wholesome tea and bread and butter.”

The taste for novel reading in youth needs guidance, and sometimes restraint. Trashy stories about Indians, pirates,

and detectives should be tabooed. Without literary merit, with rare exceptions, they please only by reason of their sensationalism and the immature minds of their readers. Almost all books of this class are corruptive of good literary taste. Happily, sensible, well-bred youth soon loses, if it ever has a liking, for this sort of reading. The best antidote for poor books is acquaintance with good ones. The works of Sir Walter Scott, Thackeray, Dickens, George Eliot, and other good writers are enjoyed by all who can distinguish between the real and the spurious in literature. Well-written historical novels are mines of interest to youth. Dickens succeeded well in his "Tale of Two Cities" (that is, London and Paris) in making the suspense, dangers, and horrors of the Reign of Terror in the French Revolution present to the mind. Thackeray has powerfully delineated in his "Esmond" and in "The Virginians," the condition of politics and society, the wars of Marlborough and the American Revolution. Blackmore has described the rebellion of Monmouth in "Lorna Doone." Much light is shed for us upon the time of Queen Anne, of England, by Addison, Steele, and Swift. The poems of Dryden form a commentary upon the period of the English Restoration and the reigns of Charles II and James II. The life of the succeeding Georgian period is illuminated for us by Fielding, Richardson, Goldsmith, and Johnson. In reference to the power of the imagination, under skillful guidance, to make history vivid to our minds, Carlyle says: "Marlborough, you recollect, said he knew no English history but what he had learned from Shakespeare. There are really, if we look at it, few as memorable histories. The great salient points are admirably seized, all rounds itself into a kind of rhythmic coherence; it is, as Schlegel says, *epic*; as, indeed, all delineation by a great thinker will be. There are right beautiful things in those pieces, which, indeed, together form one beautiful thing. That battle of Agincourt strikes me as one of the most perfect things, in its sort, we anywhere have of Shakespeare's. The description of the two hosts; the worn-out jaded English; the dread hour, big

with destiny, when the battle shall begin; and then that deathless valor. ‘Ye good yeomen whose limbs were made in England!’ There is a noble patriotism in it—far other than the indifference you sometimes hear ascribed to Shakespeare. A true English heart breathes calm and strong through the whole business; not boisterous, protrusive; all the better for that. There is a sound in it like the ring of steel.”

Such works of fiction may be regarded as having a legitimate place in a scheme of education, a place far from unimportant, and yet one that affords temptation to make it unduly important. It is only incidental instruction in history that is to be derived from the works of imagination of master-minds. The real sphere of fiction of all sorts is to bring about relaxation of the mind. Their themes should not be permitted to encroach upon hours of serious reading for instruction in science, art, or whatever may interest the student. Great poems, dramas, and various other works, satires, what not, however, should enter into any scheme of liberal education.

Children reared in cities are often privileged in having access to public and private libraries, but are peculiarly favored only if they read under guidance capable of directing their reading to the best advantage. The motto of the Ridgway Branch of the Philadelphia Library is “*Qui scit ubi sit scientia, proximus est*”—“He who knows where to find knowledge is the nearest to it.” To have a judicious guide, philosopher, and friend to point out the pleasantest roads to Parnassus, makes the beginning of reading quite easy. Without such a one in youth, much time is wasted and disappointment experienced in seeking, unaided, what will lead both to instruction and amusement. No less a person than Sir Walter Scott describes this kind of danger in “Waverley.” He says: “The instructor had to combat another propensity too often united with brilliancy of fancy and vivacity of talent, that indolence, namely, of disposition which can only be stirred by some strong motive of gratification, and which renounces study as soon as curiosity is gratified, the

pleasure of conquering first difficulties exhausted, and the novelty of pursuit at an end. Edward would throw himself with spirit upon any classical author of which his preceptor proposed the perusal, make himself master of the style so far as to understand the story, and if that pleased or interested him, he finished the volume. But it was in vain to attempt fixing his attention on critical distinctions of philology, upon the difference of idiom, the beauty of felicitous expression, or the artificial combinations of syntax. Alas! while he was thus permitted to read only for the gratification of his amusement, he foresaw not that he was losing forever the opportunity of acquiring habits of firm and assiduous application, of gaining the art of controlling, directing, and concentrating the powers of his mind for earnest investigation—an art far more essential than even that intimate acquaintance with classical learning which is the primary object of study. Young Waverley drove through the sea of books like a vessel without a pilot or a rudder. Nothing, perhaps, increases by indulgence more than a desultory habit of reading, especially under such opportunities of gratifying it. I believe one reason why such numerous instances of erudition occur among the lower rank is, that with the same powers of mind, the poor student is limited to a narrow circle for indulging his passion for books, and must, necessarily, make himself master of the few he possesses ere he can acquire more. Edward, on the contrary, like the epicure who only deigned to take a single morsel from the sunny side of a peach, read no volume after it ceased to excite his curiosity or interest. Knowing much that is known to but few, Edward Waverley might justly be considered as ignorant, since he knew little of what adds dignity to man and qualifies him to support and adorn an elevated situation in society."

Here, set down in the plainest terms, is the opinion of a man who was not only a great student, but one of the greatest writers who ever lived. He shows, in few words, that desultory reading is destructive of learning and accomplishment. For the

reasons that Sir Walter Scott assigns against desultory reading, provincial schools, academies, and libraries are more likely than similar institutions in large cities to be beneficial to youth. When it comes to real research, by educated and mature scholars, then, of course, the finest libraries, which are only in the greatest cities in the world, are they to which such scholars must resort.

When we compare the physical strength of the male with the female sex, we find that they present a great contrast. It did not always exist to the same, or anything like the same, degree in ancient as it does in modern times. American Indian women performed the labor which the men despised, their province being the fighting, and so it is to the present day among barbarous peoples. Nor is it very long since even civilized women did a large amount of hard labor in the fields. Among the peasantry of Europe the women still work in the fields and in other ways execute laborious work. The habit of the men to see their women work, while they often loll, is sometimes seen in this country among a group of immigrants, where the men stroll along smoking their pipes while the women follow with bundles and babies. Modern national habits have changed much in these respects. Wherever they have, naturally the women are not so muscular and hardy as they once were, especially that class which once worked in the fields.

Nevertheless, even now, when there has been in this respect a great change in the world, and in some a radical one, there are found individual women who are more than a match for an average man. Once upon a time, before and after two thousand years ago, the German women and children accompanied the German armies in their wars. One of the later Roman historians gives a graphic account of the assistance the women of Gaul rendered their husbands when attacked. The Roman legions were never accompanied to the field by women. They regarded such a practice as belonging to barbarians. There is indicated, by an event of the reign of Louis XIV of France, a reminiscence of the mingling of men and women of Gaul in

times of war; for on one occasion, as we learn from French memoirs, the ladies of the Court of Louis XIV followed the army on the march to the northern frontier for so considerable a distance that they were exhausted and obliged to sleep in their carriages at night. The references made by the Greeks to a race of female warriors which they called Amazons, are either mythical or else exaggerations of the martial exercises held in the region of the Caucasus. It is a fact, however, that the legends of the Greeks about Amazons receive some confirmation from the circumstance that at the present day, in the negro kingdom of Dahomey, on the west coast of Africa, women as well as men are warriors. In that country, a part of the army is composed of women, to whom is assigned the post of honor in battle. The number of these women warriors has been estimated at from one thousand to twenty-five hundred, and it has been remarked of them that they show wonderful powers of endurance.

Among the effects of civilization has been a large release of women from the obligations of hard labor. This has, of course, led to prevalence among them of less robustness of frame and muscular strength. But, even now, instances are numerous where they perform hard work. Additionally to performance of field work, more or less over the whole world, there are washerwomen, charwomen, and in some places are female carpenters, bricklayers, and hod-carriers. Even in Vienna, young girls have been seen carrying bricks to bricklayers. In the United States there is a strong prejudice against the employment of women in manual labor of the harder kinds, and yet a reasonable amount of it, in the form of field-work on farms, would be conducive to the improvement of their forms, strength, and health.

Higher education is largely sought by women, very often without capacity for it or chance in the future for its employment. The problem concerning the coëducation of young men and women is difficult, and cannot be regarded as solved until there is more experience on the subject. Two things, however, are certain: that certain differences must be observed in the

physical training of young men and women, and that women are capable of education equally with men, in at least most branches of learning. It has been sometimes stated that although women have attained great excellence in literature, science, and art, they never reach the highest pitch reached by men. This is true. It may be said, however, in reply, that never, until quite modern times, have women had opportunity to excel. But, granting that, it still remains that there are certain reasons which handicap them in comparison with men. These relate by contrast to sexual disabilities. There are others which are indirectly, not directly, sexual. Scarcely a woman has ever shown an inkling of the capacity to make long research, lasting for years, such as many men, especially Germans, habitually love and practice. Again, the brain is the organ of the mind. In men its convolutions, indicative of fine quality, are equal in fineness to those of women; but in men the brain is larger than it is in women, and, fineness being equal, size makes superiority.

Observations accumulate through ceaseless attention and experimentation, when a flash of genius binds them in a consistent whole called discovery. Work of this kind has been almost universally accomplished by men. It serves to indicate a certain difference of quality in the mental organization of the opposite sexes. The male intellect, in its higher manifestations, is endlessly striving to systematize, to discover the laws under which the world of matter works, the connection between effect and cause. In the history of astronomy, the work of Sir Isaac Newton and of Laplace illustrates this sort of tendency in the male organization of mind. Similar comprehension of physical laws led Adams, of England, and Leverrier, of France, simultaneously to the discovery of the existence of the planet Neptune, unseen at that time. The irregularities in the orbit of Uranus, what are called in astronomy, "perturbations" in a planet, proved to both of them that some unseen body's approach to Uranus caused it to act in that way through the attraction of gravitation. Accordingly, just from the elements alone of the

perturbations, they calculated the position that the disturbing body must occupy, and it was soon telescopically recognized by Dr. Galle, of Berlin. Women are too much disposed to rely upon what are called intuitive perceptions. The fact is, however, that they do not belong exclusively to the female sex. They are in reality perceptions of subconsciousness; but being derived from loosely-jointed coherence of thought, men generally recognize that they should be subjected for examination to the test of careful ratiocination, whereas many women ascribe to them, although not derived from close thought, the nature of a superior order of reason. In all countries and ages, nevertheless, women have shown high capacity for the business of life, in literature, art, science, and governmental affairs. The famous *Bon Marché*, of Paris, was founded by a woman. It is one of the greatest commercial establishments in the world. The art-pottery of Cincinnati is the outcome of an enterprise begun by a woman of that city. Every great city presents examples of similar capacity. In the Book of Judges we read that "Deborah, a prophetess, the wife of Lapidoth, judged Israel at that time the children of Israel came up to her for judgment." Sapho, who lived about six hundred years before Christ, was regarded by the Greeks, the most cultivated people of antiquity, as "the poetess," just as they called Homer "the poet." Of Sapho, Mr. Theodore Watts, in the article on poetry in The Encyclopædia Britannica, writes: "Never before these songs were sung, and never since, did the human soul, in the grip of a fiery passion, utter a cry like hers; and, from the executive point of view, in directness, in lucidity, in that high, imperious verbal economy, which only nature herself can teach the artist, she has no equal, and none worthy to take the place of second—not even in Heine, not even in Burns." Elsewhere herein mentioned, the brilliant career of Pericles, the greatest Greek of his times, was influenced by Aspasia. Zenobia, the Queen of Palmyra, is thus portrayed by the historian Gibbon: "If we except the doubtful achievements of Semiramis, Zenobia is perhaps the only female whose

superior genius broke through the servile indolence imposed upon her sex by the climate and manners of Asia. . . . Zenobia was esteemed the most lovely as well as the most heroic of her sex. She was of a dark complexion (for in speaking of a Roman these trifles become important). Her teeth were of a pearly whiteness, and her large black eyes sparkled with uncommon fire, tempered by the most attractive sweetness. Her voice was strong and harmonious. Her manly understanding was strengthened and adorned by study. She was not ignorant of the Latin tongue, but possessed in equal perfection the Greek, the Syriac, and the Egyptian languages. She had drawn up for her own use an epitome of oriental history, and familiarly compared the beauties of Homer and Plato under the tuition of the sublime Longinus." In the intervals of war, "her husband passionately delighted in the exercise of hunting; he pursued with ardor the wild beasts of the desert, lions, panthers, and bears; and the ardor of Zenobia, in that dangerous amusement, was not inferior to his own. She had inured her constitution to fatigue, disdained the use of a covered carriage, and generally appeared on horseback in military habit, and sometimes marched several miles on foot at the head of the troops. The success of Odenathus was, in a great measure, ascribed to her incomparable prudence and fortitude." After the assassination of Odenathus, "she immediately filled the vacant throne and governed with manly counsels Palmyra, Syria, and the East, above five years. . . . The steady administration of Zenobia was guided by the most judicious maxims of policy. If it was expedient to pardon, she could calm her resentment; if it was necessary to punish, she could impose silence on the voice of pity. Her strict economy was accused of avarice; yet, on every proper occasion, she appeared magnificent and liberal. The neighboring states of Arabia, Armenia, and Persia dreaded her enmity, and solicited her alliance." Defying the power of the Emperor Aurelian, and defeated in two battles, "Palmyra was the last resource of the widow of Odenathus. She retired within the

walls of her capital, made every preparation for a vigorous resistance, and declared, with the intrepidity of a heroine, that the last moment of her reign and of her life should be the same." Aurelian himself testified to her wonderful resolution in these words: "The Roman people speak with contempt of the war which I am waging against a woman. They are ignorant both of the character and the power of Zenobia. It is impossible to enumerate her warlike preparations of stones, of arrows, and of every species of missile weapons. Every part of the walls is provided with two or three *ballistæ*, and artificial fires are thrown from her military engines. The fear of punishment has armed her with a desperate courage."

No more interesting female character appears in history than the lately canonized, but often previously maligned Joan of Arc. She is called the Maid of Orleans, because she was instrumental in raising the siege of that town in France, then invested by the English. Her real name was Joanneta Darc, corrupted in the course of time to Jeanne d'Arc; in English, Joan of Arc. She was a strongly religious country girl, of hardy constitution, and of no beauty but that derived from her expression of noble mission. Near the forest of Doremy she tended her father's sheep, and in solitary meditation conceived the idea, from a prophecy that France was to be delivered from a bad woman by a chaste maiden, that she was to be the predestined agent of its rescue. The bad woman was the mother of the Dauphin of France, who himself was letting the kingdom go to rack and ruin. Jeanne d'Arc's sublime confidence in her mission inspired the French troops. She raised the siege of Orleans, captured several places, and stood by the Dauphin as he was crowned king at Rheims. Subsequently, at Compiègne, in defending the town against the Duke of Burgundy, ally of the English, her fate took a woeful turn. She was captured in a sortie from the town, sold to the English, subjected to a trial as a sorceress, pardoned through treachery, accused of relapse, and was burnt at the stake at Rouen; the King of France, who owed his crown

to her, having made no attempt from beginning to end at her ransom.

Queen Elizabeth of England received a careful education. Her tutor, Roger Ascham, extolled her for her ability, application, and powers of memory. Succeeding to the throne of England in troublous times, in the midst of war with France, with commerce in a languishing condition, she, partly by her own energy, and partly by the able counsellors whom she was wise enough to choose, stimulated and gratified the spirit of the nation, and reigned prosperously and gloriously for nearly half a century. In her reign commerce revived, the naval supremacy of England was established, and literature flourished.

The greatest poetess of Italy, Vittoria Colonna, was born in 1490 and died in 1547. Left a widow in 1525, she found the chief consolation of her latter days in the composition of poems inspired by the memory of her husband. During the last ten years of her life she resided in Rome. Michael Angelo was her friend, and to her were some of his finest sonnets addressed.

Mrs. Mary Somerville attained celebrity as a scholar in the exact sciences, and is one of the numerous instances of the compatibility of intellectual labor with health and longevity, for she lived to be ninety-two years of age. Her ability and attainments were known to competent judges before she became famous. Laplace, the great French mathematician and astronomer, declared that she was the first woman who had understood his great work "*La Mécanique Céleste.*" This great work she translated into English under the title of "The Mechanism of the Heavens," thereby securing for herself instant recognition of her talents and learning. Subsequently, she published original work of her own on physical science.

The outlines of the life of Hypatia have been rendered familiar to many readers by the novel of the same name, written by Charles Kingsley. Hypatia was a writer and lecturer in Alexandria, Egypt, upon the subjects of mathematics and phil-

osophy, during the last half of the fourth century. Her beauty, enthusiasm, and eloquence attracted many, but, as an adherent of paganism, she fell a victim to the ferocity of a so-called Christian mob.

Madame de Staël, previously mentioned here in other connections, was the most conspicuous literary woman of her time. Her work on Germany was considered the best account of one country by a native of another that had ever been written.

Jane Austin, the daughter of a country clergyman, wrote a number of novels which depict every-day life of her times, and which are still remarkable for the interest they excite in characters described, although her books were written nearly a century ago. Sir Walter Scott, expressing his admiration for Miss Austin, said: "The big bow-wow strain I can do myself, like any now going, but the exquisite touch which renders ordinary, commonplace things and characters interesting, from the truth of the description and the sentiment, is denied to me." Sir Walter, if he was wholly sincere, was too modest, and anyhow entirely wrong so far as his statement about himself goes.

The name of Charlotte Brontë ought never to be omitted in mention of those women who have attained celebrity in literature. Her story of "Jane Eyre," written half a century or more ago, is still nearly as fresh as when first published as a novel and then dramatized.

Mrs. Elizabeth Barrett Browning was known as the most distinguished female poet that England has produced. She received a good classical education, and excelled in both lyric and dramatic forms of writing. She was a conspicuous example of what can be accomplished in the way of work by a decided invalid, for she was always of feeble constitution. At the age of twenty-six she was threatened with consumption by a haemorrhage from the lungs. For seven years thereafter she led the life of a recluse. After her marriage to the poet, Browning, she always resided in Italy. Her health received great benefit by this change from residence in England, and her life was prolonged to her fifty-second year.

Harriet B. Martineau accomplished much literary work without being a writer of a high order. A series of tales that she wrote, to illustrate political economy, proved successful. She subsequently published similar tales dealing with English taxation, the poor law, and the game laws. She wrote some novels, books of travel, historical works, and philosophical essays. She expressed her own opinion of her intellectual capacity in the following words: "Her original power was nothing more than was due to earnestness and intellectual clearness within a certain range. With small imagination and suggestive powers, and therefore nothing approaching to genius, she could see clearly what she did see, and give a clear expression to what she had to say. In short, she could popularize, while she could neither discover nor invent." It is impossible for one to have a more just idea of oneself or of another than is here expressed. She had, moreover, extraordinary industry and resolution. That one of her books which was most reprobated was that which she wrote about the United States, as the outcome of a visit to this country.

Marian Evans, who wrote under the pseudonym of George Eliot, was the most consummate writer of fiction among the women of her day. She possessed a large fund of knowledge upon a wide range of subjects. Her books describe, for the most part, English middle-class country life. She drew many characters with so sure a touch that they live in the memory as real existences.

In this recital of the careers of a few eminent women who have distinguished themselves in various ways must not be omitted the name of Madame Curie, who, with her husband, made lately the wonderful discovery of radium, thereby revolutionizing all previous conceptions about the constitution of matter.

The mass of men and women need merely the kind of education which fits them for the obvious work of life. Men are necessarily devoted to science and business pursuits. The des-

tiny of women is not so indissolubly linked as theirs is to such objects of thought and action. The sphere of women is more closely associated with the solidarity of the family, the foundation of the civilized state, than with any other line of endeavor. They may or may not be highly educated, but their influence is great as sisters, wives, and mothers. What is fame compared with their silent influence? Great men have generally attributed their success to their mother's training. Not all women marry; some will not. Various circumstances prevent marriage. Many women are left with dependent parents or near relations, to whom they owe the duty of protection. Successful attempts to regulate the destiny of women according to a conventional scheme is cruel sacrifice of them to the prejudices of a past time. Paganism, in which women were lightly considered, fell before Christianity; but the practices of the former in respect to the relations of the sexes have not even yet been wholly obliterated. If a woman manifests a strong inclination towards a certain career, no factitious obstacles should be placed in her way. It is irrational to aid her to become a trained nurse and bar her from the study of medicine. Exceptional individuals are relatively few in either sex. With the vast majority of men and women occupation is determined by petty circumstances. It is the small minority of either sex that advances, or is capable of advancing, to the highest acquirements.

As regards the physical effects of college life upon the health of young women, a comparison of mortality statistics, collected by Mr. L. H. Marrel, is instructive. From these it appears that, during a period of thirty years, only 10.39 per cent. of the graduates of Mount Holyoke Seminary died, while in the same term of years, only one institution for men, Williams College, showed a lower rate, namely, 10.12 per cent. But, within the same time, the percentage of deaths among Harvard men was 11.52 per cent., that among Yale men, 13.42 per cent., and that among Dartmouth men, 16.83 per cent. The figures

relating to the colleges for men exclude persons who were killed or died of injuries or of disease connected with the Civil War.

There can be little doubt that intellectuality and longevity are physically associated with each other. It is not strange if it be so. The great ganglion of a large and well-convoluted brain is an apparatus compelling by its possession to its exercise, and activity of organs naturally leads to their health, improvement, and duration. A few examples in point of this statement will suffice. Chevreuil, the French chemist, passed his hundredth year. Baron Liebig, the German chemist, lived until seventy. Galileo, the great astronomer, lived to seventy-eight. Flamsteed, the English astronomer, was seventy-three when he died. Usher, the distinguished ecclesiastic, lived to be seventy-six. Jeremy Bentham, the philosopher, lived to eighty-four. Thomas Reid, the Scotch metaphysician, died at eighty-six. Leibnitz, the mathematician and physicist, died at seventy. La Grange, the great mathematician, lived to seventy-seven. Laplace, the great astronomer and mathematician, lived to seventy-eight years. Alexander von Humboldt, physicist, was nearly ninety when he died. Goethe, the great poet and philosopher, died in his eighty-third year. William Cullen Bryant, poet and journalist, died at the age of eighty-four. Wieland, the German writer, attained the age of eighty. Holland's greatest poet, van der Vondel, lived to see his ninety-second year. Calderon, the most eminent dramatist of Spain, reached eighty-one years of age. Metastasio, the Italian poet, lived to eighty-four. Lope de Vega, the prolific Spanish dramatist, lived to seventy-three. Daniel Webster was seventy, and Henry Clay seventy-four when they died. Horace Binney, the eminent lawyer, was ninety-five at the time of his death. Benjamin Franklin died at over eighty-four years of age.

It is clearly shown, from the cases cited, to which hundreds more might be added, that intellectual work has no direct influence upon impairing health, but, on the contrary, a tendency to improve it, and lead to longevity. Indirectly, however, it

may affect the health unfavorably; that is, a too sedentary habit connected with it may have that consequence. It is for the student to see that he does not neglect all that hygiene directs in fresh air, water, food, exercise. In itself, intellectual employment is less tasking to its followers than is commerce. There are numerous examples on record where intense students were not unmindful of their body's welfare. Such a cult manifested itself some years ago, representing exercise of intellectual men, called muscular Christianity. Among the Greeks exercise was never neglected, even among the most intellectually gifted. Alcibiades competed successfully in the Olympic games. Socrates has already been mentioned here as soldier and athlete. Christopher North, the well-known Scotch writer, was distinguished for his athleticism. Charles Kingsley, the writer, was associated in the minds of all English readers with muscular Christianity. Hundreds of instances could be given of ancient and modern intellectual athletes.

The reader may ask himself, perhaps has already asked himself, what possible connection there can be between cultivation of the mind and increase of beauty. However, just as there is an intimate relation between physical health and beauty, so there is also a similar one between mind and beauty. It would be preposterous, it would be falsified by common experience, to claim that the action of the mind could change the form of features. Mirabeau, the great French orator, and Lord Chesterfield, contemporaries, two of the most intellectual and accomplished, as well as two of the ugliest men of their times, died as ugly in features as they had lived. But has the reader not come to know from observation that expression is largely independent of shape of features, and that there are various forms of beauty, such as represent refinement, distinction, intellectuality, nobility of expression? Now, in previous remarks here the fact has been dwelt upon, that certain muscles of the face are actuated by the emotions and essential character of the thoughts and passions of their possessor. Nothing is more plain to the observer

who has for years witnessed the conduct and at the same time has been familiar with the faces of many persons, that they gradually received the impress of their mental and moral attributes in their expression. One must have lived but a short time not to have been convinced of this fact beyond a doubt. Both men and women live, who in early life were extremely plain, but who, through the growing influence in them of refinement and high mental and moral exercise of their faculties, have become handsome in nobility of expression. Nor can any keen observer have failed to see that, if mental and moral endowments have been abused, or have not been exercised, even original beauty has gone to wreck, or if not that, loftiness of expression, in which refinement and intellectuality are combined, has never appeared upon the face. One cannot look upon a gallery of the portraits of the great and good, the great only, or the good only, without recognizing that the expression of worth, or whatever other quality was possessed by the original, was, as already said, largely independent of the form of features. In a word, the habits of refined association and of study and thought of the higher order impress themselves finally upon the features. It often happens that the cultured man or woman is far handsomer beyond middle age than in the prime of youth, handsome with a refinement or a nobility of expression in which youth, with the finest features, may be wholly lacking. So potent are these mental and moral influences here discussed, that their opposites produce in the finest features the appearance of commonness or of positive vulgarity.

CHAPTER XIII.

CLOTHING AND DRESS.

CLOTHING is regardable from three essentially different points of view, dependent upon the uses to which it is put—as covering for protection against cold, as covering to conceal nakedness, and as covering of the partly or wholly ornamental sort, known as dress. If the reader would like to make intimate acquaintance with the philosophy of clothes, in the sense of ornamental human appendages, he cannot do so to better advantage than by reading one of the most remarkable books ever written, "Sartor Resartus," by Thomas Carlyle.

Among the Greeks and the Romans there was not, for many centuries, any change in the fashion of dress. Among the Greeks the undergarment of women extended from the neck to the feet. It was slit above and below, and made of a fullness represented by the extended arms of the woman, so that it fell around the body in numerous folds. This part of the dress was bound under the bosom by a sash, and its upper borders fastened over the shoulders by brooches. The arms were either left entirely bare, or else were covered only slightly by the garment being allowed to fall a little way over the shoulders in the form of a short sleeve. The garment being wide, it could be, for the sake of warmth, doubled over the bosom and shoulders. Its material was generally linen, but was sometimes silk. Hanging from the hips, a short woolen petticoat was worn.

These pieces of clothing represented indoor use. For outdoor service there was thrown over the person an article of clothing somewhat resembling a shawl, which was wrapped in varying folds about it, and could be drawn over the head like a hood. This wrap was worn in various colors, black being used for mourning. It was customary to have the outer and

inner robes of strongly contrasting colors, and they were often embroidered. The outer kind of wrap was worn by men as well as by women. Another kind of outer garment was worn by young men, consisting of a cloak fastened over the right shoulder by a brooch. Grown men wore no covering on the head. Women's heads were ornamented with crowns, bands, and pins. They wore ear-rings, finger-rings, brooches, bracelets, and necklaces.

The dress of the Etruscans was essentially like that of the Greeks. But the Etruscans wore upon the head a high, pointed hat. The outer garment of the Romans was called the "toga," and was not worn by the youth of Rome until they had attained sixteen years of age. It was then assumed with ceremony by the youth, as having reached man's estate, and it was then called the *toga virilis*—a man's dress. This consisted of a width of cloth of an elliptical shape, wrapped about the body in certain folds, forming a drapery, with the appearance of which we have become familiar through seeing ancient statues. The toga was made of thin woolen cloth, and for citizens without rank was always white. A purple border on the toga indicated that the wearer held some official rank. The highest office was indicated, on great occasions, by the wearing of a purple toga. The dress of the Roman ladies was like that of the Greek ladies.

The Anglo-Saxons wore a short, sleeved tunic, bound around the waist by a girdle. It was of various colors, and was either plain or ornamented, according to the means or the social station of the wearer. Over this article of clothing was thrown by young men a short cloak, and a longer one by men of more advanced age. Stockings, shoes, boots, and sandals were worn on suitable occasions. The tunics of the women were made long, like gowns. Over these they wore shorter, wide-sleeved tunics, which were often elaborately embroidered.

During the eleventh century, ladies of the Norman nobility wore richly decorated dresses, so long that they swept the ground. The sleeves were widened at the wrists, and cut so as

to droop to a point. In the thirteenth century, a loose tunic swept from the throat nearly to the ankles. Over this garment was a full-sleeved dalmatic or robe, secured around the waist by means of a buckled girdle, the whole costume being covered by a mantle. During the same period, the outer dress of women of high rank was a long, loose, and flowing robe with full sleeves gathered in at the wrists, a mantle hanging from the shoulders, and a purse from the jeweled waist-girdle. In the fourteenth century, the Queen of Edward II wore richly embroidered dresses of cloth of gold or silver, adorned with jewels. Others were of velvet of various colors and shot taffeta. Others again, were of green cloth from Douay, and of rose satin. Jackets with the sides more or less cut away, so as to show the dress beneath, were also worn by ladies during that century, and the dress of the men approached in magnificence that of the women. The cut-away style of jacket remained a favorite female article of dress for nearly two hundred years. The dress of men was made to fit closely to the person, their shoes were drawn out into long pointed toes. In the fifteenth century dress was very elaborate. Men were garbed in long, loose robes, with very wide sleeves and closely fitting tunics, descending midway from knee to ankle. Ladies wore grotesque head-dresses, known from their various shapes as horned, mitre, steeple, butterfly, etc. The persistence of style of dress in provincial communities, contrasting strongly with the opposite condition among people in touch with all the world, is illustrated by the present head-dress of the women of Normandy. This is nothing more nor less than the survival of the mode that was the fashion five hundred years ago among the court ladies. It is a high, conical horror of a head-dress. In the various countries of Europe, says M. Lacroix, a French writer, "we have seen, and still see, entire provinces adhering to some ancient custom, causing them to differ altogether from the rest of the nation. This is simply owing to the fact of the fashion having been obsolete in the neighboring places; for every local costume faithfully and vigorously

preserved in any community at a distance from the center of political action or government must have been brought there by the nobles of the country."

In the sixteenth century a distinct separation began to take place between mediæval and modern styles of dress; present fashions may justly be considered to have originated at that time. The clothing of men was made to fit more closely to the person. Tightly-fitting dresses were adopted by the women. In early Tudor times men wore a long, loose garment with open sleeves and a belt or girdle, above which the coat was open, a broad collar falling over the shoulders. Beneath this garment was a vest, and beneath that a shirt showed at the throat, appearing also at the wrists. Another style of the same period consisted of tightly-fitting vest and hose, worn under an open doublet with long and loose sleeves. The doublet was a tightly-fitting coat that reached but a short distance below the waist. The hat was low-crowned, broad-brimmed, and decorated with plumes. The legs were clothed in two distinct coverings, the hose being partly tight and plain, and partly puffed, slashed, and embroidered. The upper part was called hose, and the lower, stockings. At the end of the sixteenth century, the hose became "breeches" and hose gradually came to have the limited meaning of stockings.

During Queen Elizabeth's reign, long, peaked, and tight "stomachers" were worn by women, and padded and quilted doublets by men. Large and stiff ruffs surrounded the necks of both men and women. The sleeves of both sexes were slashed and puffed. The outer skirt of women was projected for some distance from the person by "farthingales." Ornaments were very generally worn. About the middle of the sixteenth century dresses were made high at the waists and around the hips by means of large padded rolls, and still more protruded by a contrivance of padded whalebone and steel. This fashion developed into "panniers," which were worn then for a long time, and which were revived long afterwards.

In the reign of James I, noblemen wore long, pointed, and tight doublets, slashed and padded trunk-hose, tapering to the knees, where they were tied by bowed ribbons. Hats were tall and conical, with the brim turned up on one side. Shoes were broad, and adorned with rosettes. The farthingales of the ladies attained immense proportions.

In the reign of Charles I ladies wore wide sleeves. They were, however, tied at the elbows and drawn in at the wrists. Dress-bodies were tight, and were often made long and pointed in front. A loose petticoat was displayed beneath a loose open gown. Around the throat was worn a deep-falling collar. Patches, made of black court-plaster, began to be worn upon the face. This singular custom, introduced with the notion that, by contrast, the black patches enhanced the beauty of the complexion, continued in vogue throughout the century.

Charles II wore a long, loose doublet, richly laced and embroidered, with large sleeves; under the doublet was a sleeveless vest. The trousers were wide and gathered in at the knees by ribbons and lace ruffles, his throat was encircled by a lace collar, and his head surmounted by a large wig. His hat was broad-brimmed, with one side turned up, and decorated with plumes. His shoes were fastened at the instep with large bows. A cloak completed the costume.

During the last half of the seventeenth century men wore long coats and vests. The sleeves were made with broad cuffs, doubling back from the wrists. Ladies wore rich satin petticoats with long, trailing gowns. During the reign of William III, small-clothes, more vulgarly known as knee-breeches, were introduced into England. In winter, men wore muffs suspended from their necks with ribbons, and in summer, lace-trimmed gloves. Among women, long bodices and tight corsets were fashionable. Dresses were either gathered up at the back or drawn out into a train. Sleeves were tight and reached the wrists, where they turned up into cuffs from which issued lace ruffles. Furbelows were fashionable.

A writer upon British costumes thus describes the dress of noblemen and gentlemen during the reigns of Queen Anne and George I: "Square-cut coats and long-flapped waistcoats with pockets in them, the latter [waistcoats] meeting the stockings, still drawn up over the knee so high as to entirely conceal the breeches (then made to fit with comparative tightness to the limbs), but gartered below it; large hanging cuffs and lace ruffles; the skirts of the coat stiffened out with wire or buckram, from beneath which peeped the hilt of the sword, deprived of the broad and splendid belt in which it swung in preceding reigns; blue or scarlet silk stockings with gold or silver clocks; lace neck-clothes; square-toed, short-quartered shoes, with high red heels and small buckles; very long and formally-curled perukes, black riding-wigs, bag-wigs, and night-cap wigs; small three-cornered hats laced with gold or silver galloon, and sometimes trimmed with feathers." The head-dresses of the ladies were either very low or very high.

Soon after the opening of the eighteenth century the hooped petticoat was introduced. This style came into fashion again some forty years ago, under the name of crinoline. At the middle of the century the hooped skirts became of enormous size. Towards its close, ladies' dresses were made open in front and trailing. Small hoops were then in fashion. A little later dresses were made short-waisted and fell in straight folds to the feet. Hoops and open dresses were discarded.

At the beginning of the French Revolution a new style for both men's and women's dresses was adopted by French society. Men's coats were made to button at the waist, from which point they sloped away above and below. Puffing, lace, and embroidery were abandoned. The breeches either stopped short at the knee or were carried a few inches below it, where they were buttoned and laced. A large cravat was tied loosely with a bow. The attire of women of fashion was still more fanciful. For them a hybrid imitation of the ancient Greek costume was introduced. The bodice of the dress was cut extremely low, the skirt

clung closely to the figure, the feet were shod with sandals, and the stockings often had toes corresponding with the fingers of gloves.

Nowadays, and for a century or more past, the dress of men and women, whatever have been the fluctuations of fashion, has been quite distinctive. No more, as in mediæval and later times, have men gone bedecked with laces and embroideries, these being reserved exclusively for members of the other sex. The dress of men of all ranks has been of extreme plainness; so plain, in fact, that for some years past there has been an occasional prompting in society to reduce somewhat its extreme plainness by some modification, in æsthetic interest, of its color and form.

We are accustomed to think of clothing as keeping us warm. But clothing is not in itself warm, it causes warmth by retarding the escape of heat from our bodies. The whole of the heat concerned is what is known as the animal heat of the body. And, as has been previously mentioned here, this animal heat is maintained at substantially the same point, whether in the tropics or in the frozen zones. At the equator there is so high an atmospheric temperature that there is no need of conserving the temperature of the body. At the poles, it is a matter of life and death to do so. This being the fact, it behooves us to know what, in clothing, forms the best material to help us in adjusting our comfort to atmospheric conditions, which include moisture as well as heat and cold.

It is of great importance that clothing, especially that which is worn next to the body, should be of such a character as to give free action to the skin. It should not interfere with the secreting function of the skin and with the accessory breathing that goes on through that tissue. Certain bodily conditions and periods of life especially call for the protection of clothing. Infants are very sensitive to a low temperature, requiring to be warmly clad. Those persons whose blood is thin, who have recently suffered from illness, or who are sedentary

in their habits, are very sensitive to atmospheric changes, and need carefully to avoid exposure to them. With them, the processes of life are languid, as they are also among the aged; heat is less abundantly generated, and this fact should be recognized in choosing their clothing.

The substances from which the material of clothing is derived belong to both the animal and vegetable kingdoms.

Linen is made from the inner bark of the flax-plant. It is among the oldest of the materials used for clothing and other purposes. The plant is mentioned in the Book of Genesis as grown in Egypt in the time of the Pharoahs. We read that Solomon obtained linen from Egypt, and Herodotus mentions that, in his time, the linen trade of Egypt was large. 'Linen formed a portion of the dress of both the Egyptian and the Hebrew priests, and it has been recognized in the wrappings of mummies. The durability of the material is mentioned by a German writer who examined several pieces of it among the wrappings of a mummy, and remarked that this "venerable linen which had been woven for more than seventeen hundred years was washed without injury." Mention of purple and fine linen, as sumptuous wear, comes to us from the Old Testament. Tyrian purple dye was celebrated all around the shores of the Mediterranean.

A great variety of dress-goods comes to us from linen. Lace, cambric, and lawn are among them. The beautiful smoothness of linen adapts it well, where there is great heat, but not much moisture, for wearing next the skin. It has the disadvantage for that wear of being what is called hygroscopic, susceptible to moisture; and if moisture be prevalent and coolness in the atmosphere suddenly succeeds heat, it becomes cold and clammy. It is an excellent conductor of heat, and that is the reason why linen sheets are so delightful in summer. They remove the heat from the body. For these reasons, linen is a good summer bed-clothing, good for outer garments in hot climates, but bad for underclothes in hot and damp places liable

to sudden changes in temperature. Its fiber is entirely different from that of cotton. Looked at with a high-power microscope, it is perceived to consist of smooth threads, whereas those of cotton are fuzzy.

Cotton cloth is manufactured from the fluffy contents of the pod of the cotton-plant. The art of spinning and weaving it into cloth is one of great antiquity. In India the plant has been cultivated and the cloth manufactured from beyond the earliest times of which we have any record. In Egypt, also, cotton cloth was made at a very early period. The Romans obtained it from India, but made very little use of it for purposes of dress. According to the testimony of travelers, some tribes of the interior of Africa practice the art of spinning and weaving cotton. The East Indies, although using crude machinery, produce beautifully fine muslins. It has been found in the tombs of the ancient Peruvians. It is a very soft, pliable material, and lacks the smoothness and finish of linen. It does not absorb moisture nearly so easily as does linen, and is therefore generally much better fitted for underwear than linen is.

Silk is (except the limited quantity from certain spiders) the product of the mulberry-leaf-eating silkworm. In spinning their cocoons, the silkworms emit from their spinnerets a fine thread of a viscid, tenacious kind. This is known as raw silk. According to the literature of China the silk industry began there about twenty-six hundred years before the Christian era. Later, attention was directed to the cultivation of the white mulberry, which is the usual food of the worms. They will, however, eat other food, even lettuce, in an emergency. The secrets of the art were so jealously guarded in China, that it was not until A. D. 300 that silk was introduced into Japan, and at a subsequent period into India. Among the Greeks, Aristotle was the first writer to make mention of silk. The Greeks had obtained knowledge of it through the Persians and the Phoenicians. About the beginning of the Christian era it became generally known, and was highly prized as a material for dress.

The Emperor Justinian, of the Byzantine Empire, made great efforts to introduce silk culture into his dominions, and he monopolized the manufacture, establishing looms, operated by women, within the imperial palace at Constantinople. At a later period the cultivation of silk was carried on by the Saracens, and gradually spread to Italy and other European countries. Repeated attempts have been made by Great Britain and by the United States to introduce silk culture within their dominions, but without marked success. The cheapness alone of labor in China would seem to place an insuperable barrier to its successful cultivation by either of these states.

More than half of the silk thread, as it comes from the cocoon, is composed of a substance similar in constitution to hair, nail, or horn. It is a brilliant, soft, white, or slightly golden substance covered with a gelatinous matter known as silk-albumen. The fiber of silk is round and soft. It is a bad conductor of heat and absorbs less moisture than cotton does. On account of its softness, smoothness, dryness, and warmth, it is very well adapted to underwear. It is, however, a non-conductor of electricity, and for that reason will sometimes so disturb the electrical condition of the skin as to cause itching and eruptions.

Wool is an excellent material for both outer and underwear. It is a very poor conductor of heat, which property, therefore, renders it appropriate for winter clothing. Although the loose texture of woolen cloth allows it to absorb considerable moisture, the following evaporation is so gradual that the chill produced by damp linen under the same circumstances is not occasioned. Therefore light woolen material is very suitable for summer underwear and heavy woolen material for winter underwear and overwear. For the summer, it may be reduced for underwear to the thin fabric known in gauze undershirts, and in the winter increased to heavy merino. Whenever persons can afford it, it is comfortable to have three grades of weight for underwear. As wool is a substance similar to hair, it forms a rough material for underclothing in compari-

son with linen, silk, or cotton. Without any admixture with cotton it is irritant to the skins of some persons, they not being able to tolerate at all wool next to the body. This depends, however, largely upon the quality of the manufacture. We knew a case once where a man, having to be exposed to the weather on an extremely cold day, bought and put on a pair of the roughest kind of long woolen stockings, and at nightfall found his legs covered from knees to ankles with a bright eruption. This in an extreme case, the excellence of modern manufacture obviating such experiences now. Wool, like silk, being a non-conductor of electricity, somewhat affects the electrical condition of the skin.

The most valuable wool is obtained from the Thibetan goat. This is the fiber from which cashmere shawls are made. The wool called merino, largely used for underwear, was originally the finest in Europe. It was derived from a kind of Spanish sheep. But the Spaniards neglected to maintain the excellence of the breed, and the source of merino wool is now the old stock in Austria, Saxony, and Silesia. A useful wool is obtained from the alpaca, a native animal of the Andes. Alpaca wool has a peculiarly bright and lustrous appearance. The Indians of Peru and Chili have, from time immemorial, known how to make blankets and cloaks from the alpaca hair. Mohair is a fine, soft, pure white wool derived from the Angora goat of Asia Minor.

Hair and wool are frequently made into felt. This is, for dress purpose, used for hats, bonnets, and padding, but cloaks have also been made of felt. It is manufactured by means of compressing moistened hair or wool. In connection with the description, in a former chapter, of the constitution and form of hair, it was mentioned that, along the shafts of hair, it is jagged. When, therefore, a mass of moistened hair is put under heavy pressure, the jagged edges form so close an interlacing of the shafts that, without weaving, the cloth is produced which is known as felt.

The tanned skins of animals (leather) are used for coverings for the hands and feet. The mode of tanning seems to have been known in prehistoric times. The skin of animals is converted into leather by the action of any bark which contains the principle known as *tannin*. Tannin enters into chemical combination with the elements of the skin, with the consequence that decomposition of the skin is arrested. In mediæval Europe leather was used as a suit beneath the iron armor of the knights. Leather is still employed for many purposes of dress, such as shoes, gloves, belts, leggings, gaiters.

Fur, the skin of certain animals with the attached hair, is used for hats, coats, muffs, and gloves. These are highly esteemed for their warmth, and in many cases for their beauty also. In rigorous climates fur hats and coats are a necessity. The skins are carefully cleansed and washed in a solution of alum and water before they can be made into garments. It has been sometimes objected to both leather and fur that they prevent free transpiration of the skin, hindering its activity, and also the evaporation of its waste-products. While this is true, it is, nevertheless, also true that these articles of clothing being worn only outdoors, the objectionable features are easily overcome by increased attention to bathing. At any rate, their advantages in severe weather are largely in excess of their defects.

Drygoods are dyed of various colors and shades of colors to make them attractive to the largest number of tastes. Colors, however, have also relation to the warmth of garments. Black absorbs more external heat than white does. If one put pieces of cloth of the same size, of different colors, varying from black to white, on a bank of snow, he will find that they sink in the snow just in proportion to their darkness. This is Dr. Franklin's proof. Of course, in the experiment, the goods must all be made of the same material. White reflects heat-rays as well as light-rays of the sun, and is therefore cool in summer and warm in winter. The polar bear wears a white coat, because it retains best the heat generated by the animal. In hot weather,

white opposes a barrier to the passage to the body of external heat; and in cold weather it checks the loss of that which is produced by the body.

Underwear should, whenever convenient, be removed at night and replaced by other underwear of similar weight and texture. That which has been worn during the day has imbibed the secretions from the body and should be hung up where it can be purified by the air. This precaution is, more particularly than at any other time, to be taken in summer, because the skin is then more active than at any other time. In fact, whenever circumstances permit of it, it is good practice in summer to change the underclothing at any time during the day, if it shall have become saturated with perspiration. Of course, this is not practicable for persons whose occupations keep them away from home from morning until night.

Inferior underclothing often produces disease of the skin. This consequence may be owing either to the texture of the cloth or to a dye. Such flannel underwear may give rise to a diffuse inflammation of the skin, known as *erythema*, which is attended with heat and itching. It may give rise to *eczema* or to *pruritis*, itching. Colored stockings, dyed with impure, irritating substances, often occasion severe and extensive disease of the skin. It has been experimentally proved that the microbes which excite disease, deposited with dust upon the underwear, can penetrate its interstices and reach the skin. In this fact alone we find good reason why undergarments should be frequently changed.

It is always important that the feet should be kept warm and dry. If a person has been caught in a storm and for a long time had wet and cold feet, he should, immediately upon reaching home, immerse his feet for a few minutes in warm water, dry them carefully, and put on fresh shoes and stockings. No greater sense of comfort can be produced, and no better security against taking cold could be adopted. Orientals wear sandals, as was also the practice of the Greeks and Romans, although the ancients did

make use of shoes, and even of boots, on occasions. The use of sandals necessitated, and at the same time rendered easy, the habit of frequent washing of the feet. The Indians of this continent wore, in the form of the moccasin, something quite as light as any sandal ever was. Cold feet are a cause of general bodily disturbances. They interfere with the circulation of the blood and give rise to headache. Physicians sometimes find it useful when a patient has a flushed face and blood-shot eyes, to apply cold to the head and heat to the feet, thus relieving the brain of its surplusage of blood. Many young girls suffer from cold feet. The quality of their blood is poor, their circulation languid. They love overheated rooms, and are averse to exercise. The circulation in the feet may be stimulated by dipping them for an instant in cold water and then briskly rubbing them with a towel, or by the use, alternately, of hot and cold water; or by bathing them in mustard and water, or in salt and water. There are a number of drugs that are administered with the view of removing such a lack of tone as that here indicated, but it is preferable to remove it by means of physical exercise.

Shoes are a great protection. They protect the feet from rough, hard, and sharp objects that might bruise or wound them. A neatly-fitting shoe is attractive for either sex. A woman well-gloved and well-shod is well dressed if her clothes are only, however plain, reasonably well-made and clean. Men are generally fond only of comfort and of elegance of manufacture in footwear, but great numbers of women are given to the practice of wearing shoes a size or more too small for them. This wearing of shoes too small, especially if they be propped on high heels, is very deforming to the feet. An old gentleman tells the story that, at the time when people of both sexes went in the water at Atlantic City barefoot, he one day walked along the beach there at bathing time, and did not find, out of about two thousand specimens, more than half a dozen handsome feet among the women, so injured were they by the habit of wearing shoes that were narrow and stubby. The day was, and not so many years

ago, when shoe-making, as a manufacture, was so imperfect, in comparison with the excellence which it has reached nowadays, that even shoes made to order fitted so imperfectly that they had to be "broken in" in the house, before one ventured into the streets with them. Now, their manufacture has reached perfection; a ready-made shoe can be got nearer to a fit for the customer than he is likely to get one made to order. The system regulating sizes by the combination of numbers and letters secures a fit for anything but extraordinary deviations from the normal range of feet.

If people generally would only come to realize, in younger days, how improper footwear then worn, brings about suffering in middle and old age, they would be more prudent. There is nothing more miserable than the grinding pain from large corns and bunions. An old lady of our acquaintance used to say when she found one of her own sex particularly cross and disagreeable, "Oh, poor thing, her feet hurt her." Corns on or between the toes, or still worse, upon the soles of the feet, are brought about by tight or by ill-fitting shoes. Bunions, coming from inflammation of a joint of the foot, are invariably produced by shoes that have been worn too tight. Tender feet must be ranked among the miseries of life. To the man or woman who becomes troubled with sore feet, walking is a painful art. We have known people who were veritable martyrs to former vanity. And painful feet are not without unpleasant effect upon the expression of the face. The combination of too short, too narrow, and too high-heeled shoes is certain to lead to disfigurement of the foot and eventually to much suffering. And besides all this, the disfigurement and suffering are in vain for securing the object that is sought. No one is deceived as to the size of a foot by seeing it in a shoe too small. On the contrary, its being so placed calls attention to the fact. Nothing in the way of vanity can be more egregiously unsuccessful. Even if it were successful, it would be a failure. A disproportionately small foot is not an attribute of beauty, but a

physical defect. Even an instep may be so high as to be as ugly as a flat foot. It may, and sometimes does, make the foot look like a hoof.

Tight garters impede the circulation of the leg. The leg ought always to be gartered above the knee. In old times the leg was generally gartered below the knee. Now many people have grown wiser. The blood, of course, always gravitates towards the lower extremities of the body. This ought to be evident to everybody if it be observed that, in standing or walking for a long time, the feet become larger, sometimes quite swollen. Now, as in the process of circulation of the blood, it should be returning constantly to the heart, it ought to be evident that a constriction of the leg by the garter adds to the difficulty of the blood's return from the feet, already tending by force of gravitation to settle there. The presence of a quantity of sluggish and non-aërated blood in the veins of the leg and foot tends in winter to produce chilblains, from which many persons suffer year after year. The impediment, moreover, causes these veins to become engorged, distended, and tortuous. This is the ailment known as the condition of varicose veins, which is a starting-point for other diseases. The veins of the extremities contain valves, placed at short intervals in such a manner as to permit the passage of the blood towards the heart, but to prevent its reflux. By this simple and beautiful mechanical arrangement the column of blood is aided in its ascent. If, however, the veins are habitually engorged and distended, the valves, in the course of time, break down, and the circulation becomes torpid, the nutrition of the skin is defective, and it may eventually become the seat of eczema or of an ulcer. All this train of consequences has been known to follow the use of tight garters.

There has never been a time since the invention of the corset when well-instructed men and women have not inveighed against the tight corset for any but its legitimate use in supporting the bust. Its abuse is one of the most perverse prac-

tices of which a portion of the female world has ever been guilty. One thing alone would seem to have been an ample deterrent, that members of the opposite sex, for whom women mostly prepare their toilets, do not like excessively small waists. Such waists are to them significant of imperfect physical organization and health, and some men almost shudder at the sight. There is one thing, and only one thing, that could have cured the whole world of tight-lacers of their abominable practice. That is, however, what only a small fraction of them ever see. It is the skeletons, in anatomical museums, of women who had been addicted to tight lacing. If the whole world of women, instead of only a few of them, had ever seen these malformed objects, with the lower ribs permanently crushed in, presenting the greatest possible contrast to the figure of a well-developed form, never again would they have indulged in tight lacing. Tight lacing means dislodgment of internal organs, and circulation of the blood and free breathing impeded. The blood is imperfectly purified, the heart's action greatly diminished, becoming irregular and feeble, and the nutrition of all the important organs and tissues suffers. The person addicted to this practice becomes pale, is subject to palpitation of the heart, and not infrequently to fainting fits. Happily for the fashionable world this wretched practice has sensibly decreased. Two or three generations ago, it was so prevalent that scarcely a large ball took place when some woman did not faint and the cry arise, "Cut her stays, has any one smelling-salts?" In tight lacing the stomach is disturbed by the pressure that prevents its expansion after eating, and flatulence occurs. The gas in the abdomen presses it upward against the diaphragm, the muscular partition that separates the cavity of the chest from that of the abdomen. The apex of the heart, a somewhat conical organ, rests upon the diaphragm, and when the diaphragm is raised by the pressure of the gas, palpitation of the heart is occasioned. A species of blood-poisoning takes place, from interruption of natural processes; the complexion loses its bloom, and the face gradually

acquires a pasty hue. Some or all of these heavy penalties are sure to follow persistent tight lacing.

Although a comparatively unimportant article of dress, as but slightly related to health, the veil is not without interest in relation to both health and appearance. The veil has been worn from time immemorial in one form or another. At the present time women are fond of wearing short veils hanging from the hat, and very many of these are spotted. They are, as a general rule, becoming; but when spotted, care should be taken in adjusting them. Within a very few weeks we happened to see two cases in which the careless adjustment of the spots produced an effect far from that contemplated by either of the fair wearers, for both were really fair. In the first case, a black spot on the veil came so exactly opposite one of the eye-teeth, that the tooth seemed, at the distance of six feet, to be absent. In the second case, two large white spots so exactly corresponded in position with both eye-teeth that the effect produced was exactly that of two great fangs. Take it altogether, most women are improved in appearance by a light fabric of a veil. Babies, when taken out in their coaches, lying flat on their backs, should be shielded by parasols in the summer-time, and in winter by veils; but sometimes the veils used for this purpose seem almost too thick. It stands to reason that if a veil for any person reaches below the mouth, where it is necessarily breathed through, its cleanliness should be strictly guarded in these bacterial times.

The weight of a person's clothes and the fabric should be suited to occupation. Men of active bodily habits and vigorous circulation generate heat rapidly and do not need clothes so heavy as do those of opposite constitution. It is a mistake for one of vigorous constitution to bundle himself up with a great weight of clothes in winter; that reduces the generation of animal heat. Persons who shiver with the least cold, who muffle themselves up, render themselves valetudinarians. Winter

underclothing should be warm, and outer clothing sufficiently thick to prevent heat from being lost more quickly than it can be supplied by the body. With experience, every one should be able to find out exactly the amount of clothing desirable for him personally. It would not be safe for the citizen to go about with the bare knees of the Scotch Highlander or the bare neck of the sailor.

In these last cases mentioned is indicated the influence of bodily habit in exposure to weather. The most remarkable of any known in that respect is the case of the Patagonians. Sir Erasmus Wilson quotes an account of the Indians of Terra del Fuego, who wear a "small piece of seal-skin which they hang upon the shoulder next the wind. Their climate is much colder than that of North Britain, no season being quite free from frost. In the month of March, when the thermometer stood at forty-six degrees, an infant about a week old lay in the bottom of one of their canoes quite naked; and little children were seen, quite naked, capering on the beach, although the thermometer was at forty degrees."

Notwithstanding their superior physical hardihood, savages possess no charm whereby they can resist temperature of twenty, thirty, fifty degrees below zero. The Eskimo and the tribes of Northern Siberia encounter these low temperatures, but their dress of furs and their peculiar dwellings protect them from extinction by cold. The bare-kneed Highlander and the bare-necked sailor are temporarily acclimated to cold. It is a well-known fact, that men may go out from the heart of civilization and shelter, or live in the open, in camp or otherwise, exposed to a lower temperature than that to which they have been accustomed, and become so inured to it as to suffer no inconvenience, but that when they return to heated houses they invariably have bad colds.

For ordinary purposes the hands do not need gloves in temperate climates. The Greeks did not use gloves except for pro-

tection of the hands in certain kinds of labor. They are used at the present day for the same purpose by ladies fond of gardening. When, in the middle ages, the knights fought in armor, the iron gauntlet was part of the coat-of-mail. Throwing down the gauntlet became then a symbol of defiance, and wearing a lady's glove on the armor one of championship. Gloves of skins finally became worn in Europe generally. They were put upon the hands of Henry II, John, and Edward I, when they were buried. In the fourteenth century they were habitually worn in England among the well-to-do class of people. During the reign of Charles II the style prevailed of wearing short-sleeved dresses and gloves reaching almost to the elbow. The glove has had a sentimental significance through the age of chivalry down to the present time. Schiller's poem of "The Glove" is well known. In the reign of Robert III, of Scotland, the handi-craft of glove-making was chartered in the city of Perth.

Women at large show certainly, more than men at large, susceptibility in dress to beauty of color, grace in drapery, and harmony of general effect. Yet the fact cannot be ignored that there are exceptional men superior to them in designing and executing fashions. To be convinced of this one has only to look around at tailor-made costumes, at what takes place in Paris, and at the uncontested supremacy of Worth.

While it is true that the style of a season may be a mere modification of that of the preceding one, it not infrequently happens that a new style is a sharp departure from the prevalent one. People get tired of sameness in the course of time. Yet, some of the discarded fashions are so intrinsically becoming that they are sure, after a certain interval of time, to be revived. The fiat goes forth from Paris, and the whole world obeys. Whatever fashion may have decreed, the woman generously dowered by nature with charms will look well in it. The danger to which those not so blessed often succumb is to go to extremes in a fashion for which their figures are not well suited. Although the advantage of dress, as an accessory, is undeniable,

the force of beauty of face and form will assert itself in any dress. Men may think some modes prettier than others, but they fall into line of approval for any costume in which a pretty woman is dressed. In "Silas Marner," George Eliot writes: "Some women, I grant, would not appear to advantage seated on a pillion and attired in a drab Joseph and a drab beaver-bonnet, with a crown resembling a small stew-pan; for a garment suggesting a coachman's greatcoat, cut out under an exiguity of cloth that would only allow of miniature capes, is not well adapted to conceal deficiencies of contour, nor is drab a color that will throw sallow cheeks into lively contrast. It was all the greater triumph to Miss Nancy Lameter's beauty that she looked so thoroughly bewitching in that costume, as, seated on the pillion behind her tall, erect father, she held one arm around him, and looked down with open-eyed anxiety at the treacherous snow-covered pools and puddles which sent up formidable splashing of mud under the stamp of Dobbin's foot."

In view of the constant revolutions of fashion, it is not strange that the trailing street-gown should enjoy periodical returns to favor. This is one fashion, however, which should be finally abolished. On the score of gracefulness there is nothing to be said against it, but it is wholly unadapted to a walking costume. The love of cleanliness should discard the trailing skirt for street wear. The most cleanly sidewalk is full of dust, and this is always impregnated more or less with germs of disease. From what was said in another part of this work, it is clear that these germs are capable of multiplication and activity when placed under favorable household circumstances. The most widely diffused disease-germ is that of consumption. It is a very serious matter for a lady in her walks to sweep the streets with her skirt and carry into her home a host of microscopic objects which may give rise there to fatal disease. Other kinds of germs are gathered up in the same way which cause suppurative inflammation and various maladies of the skin.

The deposit of the bacilli of certain diseases upon skirts is

not a mere suspicion, but one of actual demonstration. These organisms have been collected and cultivated from sweepings brought into the house by walking-dresses. It is true that these germs may be brought into our houses by other means, but it is the part of wisdom to close as far as possible every avenue to their entrance. The long skirt for the street has disappeared, and let us hope that the fashion will never be revived.

CHAPTER XIV.

THE INFLUENCE OF CLIMATE UPON HEALTH.

THE human race is found, but not everywhere flourishing, from the shores of the Arctic Ocean to the damp forests of South America, along the low, hot coast of Guinea, in the jungles of India, and in the frozen lands of British America and Siberia. It cannot be said to flourish where life is a continuous struggle for existence, without development in commerce, manufactures, science, art, or social refinements. Only that climate can truly be regarded as the finest where, through the associated conditions of weather, soil, and situation, the human race can reach the highest possible intellectual and physical development, despite imperfections inherent in those conditions; for, in a word, no climate on earth is perfect.

Apparent immunity of some native tribes to disease and consequent death may not be real to the degree sometimes imagined, for civilized people have no statistics of these for savages, and savages have none for themselves. French observers have pointed out that the malarial fevers prevalent in Cochin China during the rainy season there attack natives as well as foreigners. It is, however, also true that heredity, experience, dietetic and other habits among natives do, in the aggregate, afford them some degree of immunity. Foreigners in a climate entirely unlike the one in which they were born and bred should accommodate themselves as nearly as possible to the modes of life of the natives. The mortality among the English in India is very much less than it was for a long time after their occupation of that country. Down to fifty years ago, it was still a by-word how the English persisted in India in drinking strong ale and bottled porter and stout, just as they had been in the habit of doing in England. But even they, slow as they are compared to other peoples in accepting novelties, have learned

in India enough wisdom to keep them from their former suicidal habits there. In other tropical countries the English profited at last by the same experience that they had had in India. It is authentically mentioned that at certain English military tropical stations, the death-rate of their troops has been less than the average death-rate in England. It has been proved by Dr. Rattray, of the British Navy, that the heart's action and the rate of breathing are reduced in passing from a temperate to a hot climate. The quantity of air breathed is, therefore, correspondingly diminished. This means that the vitality is diminished. On the other hand, the activity of the skin is much increased by hot climates.

Those climates are most healthful which bring about abundant exercise and work in the open air. The temperate zone contains several very different climates. In the latitude of San Francisco, for example, the climate of both winter and summer is very equable; but opposite to it, on the eastern coast of the United States, the climate is what is known as "extreme," having very cold winters and very hot summers; and not only that, but no equableness in either. Happily for the human race, it has, upon the average, great powers of adaptation to climate. A cold, dry atmosphere is productive of great physical energy. A hot, moist one induces great languor. Hot countries generate infectious diseases, and debilitate the digestive function. They therefore weaken the power of resisting disease. Cold climates do not so readily generate infectious diseases, and when they occur in places, limit their spread. A cold, moist climate is favorable to rheumatism and to bronchial and pulmonary disorders.

Much of the unhealthiness of certain climates could be removed by sanitary measures, the drainage of swamps, planting of trees, etc. Sometimes, in the case of dense forests, they may be removed or at least diminished in size, and the draining of swamps for the sake of salubrity is always in order. The action of man in producing local modifications of climate has

been great, sometimes unintentionally, sometimes with set purpose. When done with intention it has been accomplished by removing excessive forest-growth, draining swamps, and irrigating arid territory. It is not at all improbable that in the course of time men may succeed in rendering habitable to civilized races tracts of country in which they have not been able heretofore to dwell without danger of disease and loss of life.

The skin, and therefore the complexion, are affected by climate. To the Caucasian eye no symmetry of features (and it is sometimes found even in the colored races) can atone for the darkness of skin of many peoples. Darkness of skin does not admit of the contrasts of light and shade making the modelling which go largely, in the features of the Caucasian race, to produce expression; and, in addition to this defect in the features of the dark races, they present another, in the absence of the effect of blood in the aspect of a face; either in the blood's permanent bloom there, or in its fluctuation under the spell of various emotions. A torrid temperature determines pigmentation of the skin. Nature furnishes the skin in that temperature with both more oil and more pigment. If a person from the heart of civilization exposes himself to a torrid temperature for a single season, and then returns to his home in a temperate climate, he finds himself brown for months afterwards, and his face so superfluously oily that he may be obliged to resort to a solution of borax and water to stop its glistening appearance.

The Caucasians of Southern Europe and tropical America are very dark in comparison with Northern Caucasians. Among Caucasians of the extreme habitable north, Swedes and Norwegians, slight pigmentation of the skin sometimes goes too far. A very colorless white skin, blue or grey eyes, and straw-colored hair are departures from beauty of face. The blond skin is thinner than the brunette, and therefore the blood is more apparent in it. The climate of England and Ireland, charged with moisture, is favorable to a good complexion. Englishwomen

and Irishwomen have the most beautiful complexions in the world. It was the blending of the Celt, Saxon, and Norman, with a touch of Scandinavian, that has saved the English from the monotone of the Scandinavian complexion. In the United States, the humidity of the Atlantic, Pacific, and Gulf coasts fosters brilliancy of the complexion, while the lack of moisture of the Northwestern plateau has a drying effect upon the skin and renders it comparatively toneless.

The origin of the highest forms of civilization which the world has seen has been, in most cases, in temperate climates. Egypt is one of them. There the temperature is generally high, but remarkably equable; favorable to outdoor life, to general health, and to activity of body and mind. The climate of India, the seat of very remote civilization, is, on its plains, exceedingly hot and unfavorable to human progress. But the dominant race of Hindostan, possessed of energy, brought with it to the country the rudiments of civilization which it subsequently developed. The climate of Greece, Rome, and Palestine, all ancient states, and those by which modern society has been most profoundly affected, were mild and salubrious. The peculiar and apparently unrelated forms of civilization developed in Mexico and Peru occurred in countries where nature favored health of body and mind.

The broadest possible division of climates is into those of islands and those of mainlands. When we speak of islands, we think of them relatively to mainlands, as small bodies of land surrounded by water, although, as a matter of fact, both continents of the earth are islands. Ideal marine climate is, of course, found on the broad bosom of the ocean, but the insular climate does not differ much from it on small islands. Small islands in semi-tropical regions have a delightful climatic feature in the breeze at night. As the sun goes down, the heat of the islands radiates rapidly, and as its column ascends, the cool air, from the never-changing temperature of the ocean, flows in below over the land. The seashore of the mainland

possesses some of the advantages of an insular climate. It may be properly called a marine climate. According to Dr. Hermann Weber, this kind of marine climate can be divided into three classes, determined by their varying degrees of humidity. Each of these varieties may, according to him, be subdivided with relation to temperature. Among the warm and moist climates, well known as health resorts, may be instanced Madeira, the Canary Islands, the Bahamas, the Bermudas, Cuba, Jamaica, the West Indies generally. Cool and moist marine climates are found in northern latitudes. On the Eastern continent, the islands off the coast of Scotland belong to this category. Medium degrees of humidity, with warmth, are found around the Mediterranean, at Gibraltar, Algiers, Palermo, Venice, and on this side of the Atlantic, at Virginia Beach, Old Point Comfort, and other places. Cool marine climates of medium humidity are found at various places on the English and Irish coasts. Such are found also in America at Mount Desert, Isle of Shoals, Nantucket, Newport, Fire Island. Among good winter resorts should not be forgotten Queenstown, the Isle of Wight, Florida. Summer resorts include the coast of Cornwall and Devonshire, Wales, Ireland, the northern coast of France, Belgium, Holland, and Germany. Marine climates with low degree of humidity are found on the Riviera, at Nice, Mentone, Malta, on the Mediterranean; and at many places along the coast of New Jersey, from Long Branch to Cape May. It is so damp at Cape May, that if one keeps shoes in the confined air of a handbag or trunk for a few days, he will often find them mildewed.

Marine climates have many advantages for those persons to whom they are appropriate. The air stimulates the appetite, and improves the digestion. It strengthens relaxed muscles, invigorates the heart, deepens the breathing, and promotes, therefore, purification of the blood. The tone of the nervous system is raised, the mind tends to cheerfulness, the skin becomes soft and the complexion more blooming. Sleep is sound, lassitude vanishes, and the general improvement in health is indicated by

increase of weight. Insomnia is almost impossible for one coming from the interior of a country to the seashore. Everyone must have observed that even the healthiest persons, when resorting to the seashore, experience sleepiness for a time.

Land climates differ among themselves chiefly from latitude and elevation above the sea. They may be regarded, therefore, independent of their latitude, as mountain and lowland climates. Mountainous resorts for health and renovation are numerous in Europe and America. Upon the Eastern continent, the Alps, the Maritime Alps, and the Apennines, the German highlands, the Davos-Platz, and other places may be noted. In America, Canada, Denver, Colorado Springs, St. Paul, Asheville, the Catskills, the Alleghenies, the Green and the White Mountains, all afford high altitudes. The climates of low levels include dry and warm atmospheres, dry and cold, and moderately moist. In the first variety are included California and New Mexico; in the second, Canada and Minnesota; in the third, Rome, Pau, New England, Saratoga, and other places.

In many conditions of impaired health more benefit arises from change of climate than from any other course that can be pursued. It should be known, too, that change of climate has other advantages besides those that are derived from atmospheric difference. There is a celebrated Latin line which speaks of the traveler as one who *cælum, non animam mutat*—"who changes his sky but not his mind." But the statement is not true. No man can radically change his earthly horizon without change of mind. The mind partakes of that which is presented to it. Change of climate presumes purer atmosphere sought, different scenes, different habits, different social surroundings. The mind is thus stimulated; whatever disagreeable has been left behind is dimmed in mental impression and the mind is stimulated by novelty to pleasant action. Increased outdoor activity is generally one of the results of traveling; and this, of course, is conducive to health. So, it will be observed, there are many important differences in life involved in a change of climate. Any one who

will read the physiologist, Dr. Carpenter, on the subject of the influence of the mind on the body will see that the Latin statement is altogether wrong. A temporary change for an invalid, not gone too far to recuperate, is of decided benefit, whether after an acute attack of illness or after a gradual running down in health. Choice of location for a sojourn must, of course, depend upon the nature of the disease and the season of the year. Chronic disorders demand long, perhaps permanent residence in a certain kind of place.

Scrofula is not caused, but is at least promoted, by unhealthy surroundings. Scrofulous children are subject to catarrhal affections, digestive disorders, sore eyes, and to various diseases of the skin. One of the most characteristic manifestations of scrofula is the presence of swollen glands. These are found in any situation on the body, but their favorite locality is on the neck. After they have for some time gradually enlarged, the skin over them becomes inflamed and red. In time the skin bursts in places, giving out a purulent discharge and showing little tendency to heal. Often so much skin is destroyed as to form a large, raw, ulcerated surface. If the ulcer finally heals, an unsightly scar is left in its place. Such scars detract from the comeliness of a person, and every effort should be made to save from their disfigurement.

This enlargement and destruction of glands and skin generally takes place in childhood or youth. In many cases the children possess a beautiful skin, bright eyes, and silken hair. They are attractive at first, and would doubtless become, as adults, equally good-looking. Whenever practicable, a change of the sufferer from city to country, from an inclement to a balmy atmosphere, should be made as soon as the lumps begin to appear. Scrofula is closely allied to consumption, and equally with it demands abundance of pure air. A mild, rather warm, and perhaps somewhat humid atmosphere promotes the health of scrofulous individuals and brings about a healthier condition of the skin at the site of the swollen glands, which may slowly re-

sume their normal size and leave the beauty of the skin unimpaired.

In addition to these swellings and ulcers which scrofulous children are liable to suffer from, they exhibit other forms of skin disease which are very obstinate to treatment. A gratifying improvement in these cases is often witnessed as the result of a sojourn at one of the winter resorts of Florida, such as St. Petersburg and Tarpon Springs, upon the Gulf Coast. These places are close to salt water, while just to the eastward of them extend great pine forests. Everyone has come to know, in these modern times, of the balmy, salubrious influence of pine forests. An ocean voyage, too, is most beneficial for those who have the scrofulous taint. Swollen glands tend, under treatment, to be reduced, and if ulceration in them has taken place, sea-air promotes their healing.

Change of climate affects much good in chronic bronchial catarrh. Removal to a new place of residence, as has been already indicated, has a beneficial effect even when there is not much difference in altitude and temperature between the situations. Some persons are relieved by the presence of moisture, others by dryness in the atmosphere. Bronchial trouble is liable to be aggravated by cold climates. A stay in the mountains, or at some inland place where the air is pure, particularly one in pine forests, will not infrequently bring about a complete cure. A sea-trip is advantageous to a patient suffering from bronchial affection. Sea-travel is also beneficial after partial recovery from pneumonia, when the lung has not recovered its healthy state, and when the cough lingers. Laryngitis is another affection which is ameliorated by a sea voyage. An entire change of surroundings will, in the majority of cases of asthma, prove beneficial. If the malady be not complicated with alteration in the structure of the lungs, or with disease of the heart, a sojourn among the mountains or upon high table-land is of service. If the asthma be complicated with much bronchitis, a dry climate

is preferable to a moist one for the patient; but when this is not the case, the pine woods near the coast are better.

The best way of checking the advance of consumption is change of climate. The selection of a place to stay is of so deep importance that it should not be undertaken without the advice of a physician. No absolute rule can be laid down for the choice. Each case needs to be separately considered. Some persons do best when sent to a cold, dry climate, others when sent to a dry and mild one. Some receive the most advantage from a sea-voyage, or from residence on an island situated at some distance from the mainland. In all appropriate situations it is necessary for the patient to spend as much time as possible in the open air. A most important point, which has often been neglected with the consequence of much physical and mental pain, is that the consumptive patient should never leave home if the disease is well advanced. The disease may be hastened if the patient's strength be unable to stand the stress of travel and loneliness, and he may die miserably away from home, without its comforts, and among strangers.

If travel for the patient shall have been decided upon, the next question that arises for decision is as to the mode of conveyance. In these days of rapid transit, one scarcely thinks of any other mode than railway travel; but if one can afford it, a far pleasanter and more healthful way during the mild parts of the year is leisurely progress by means of horse and wagon. The little incidents of the wayside, the changing aspects of the landscape, the pure country air, are of vastly more benefit to an invalid than is a rapid whirl from a point to a distant one in a railway car. The air of the car is contaminated, the patient sits for hours almost motionless, and can get but a glimpse of the scenes through which he is flying. He probably spends most of the time in reading a newspaper or a magazine. At night he is shut up in a berth amidst close air; good enough for one who is traveling for business, but not a fit place for one who is searching for health. If the journey must be taken by rail, the

nights should be spent at hotels on the road, providing that they are not noisy caravanserais.

In a journey by horse and wagon, or if he prefer it, by autocar, the traveler is as free as a bird of the air. He lives in a pure atmosphere, his meals are taken by his own, not a railway's time-table. He can stop where he pleases and take his night's rest where he pleases. The sense of freedom which he experiences is infinitely good for him. In this way the seeker of health is gradually gaining it all along the route, and he reaches the end of his journey refreshed and invigorated. In this way, too, the patient becomes gradually introduced to climatic differences, instead of being hurried into them; for in the transfer from one part of this country to the opposite extreme the distance is so vast that a process of acclimation is desirable.

Diabetes is a disease which requires warmth, because, from its influence, the temperature of the body becomes low. A warm, equable climate which promotes the action of the skin is the one best adapted for delaying the progress of the disease.

Chronic rheumatism, whether it has attacked the joints or the muscles, is alleviated by a warm, dry climate.

The sufferer from chronic malaria should remove to a high, cool, and dry region, free of swamps. When a man is saturated with malaria, what he regards as a strange thing often happens; that is, he so regards it, unless he is a physician. The sudden removal from an intensely malarious region to a high and perfectly salubrious one is often followed, on account of the stimulus to the system, by an attack of chills and fever.

Disease of the liver is best treated by a rather cool and elevated region.

When the blood is thin and watery an open-air life is indicated. Any place where the day may be spent out-of-doors, without need of much exercise, can be recommended. An ocean voyage is one of the best methods of improving the quality of the blood. A visit to the seashore in the early summer, and a subsequent stay at some mountain resort, is a beneficial course.

In other forms of disorder of the blood, much advantage is derived from climatic treatment. A moderately cool atmosphere, sufficiently so to be somewhat bracing, is generally productive of improvement. Nervous, debilitated, hypochondriac and hysterical individuals are benefited by change of climate coupled with exercise in the open air. Dyspepsia, not only evil in itself, but the precursor of other disorders, is admirably treated in the same manner.

Insomnia literally means sleeplessness, but in medical parlance it means so great a degree of sleeplessness as to constitute disease. It is a troublesome affection. Some persons afflicted with it dread the approach of bedtime, and upon retiring toss sleeplessly upon their couches. Digestion becomes impaired, appetite fails, and the person becomes irritable and despondent, quite out of health. Under these circumstances mountain air is very valuable to the sufferer. It is important, however, to remember that if such a person goes for relief to a public resort, it should be chosen with discretion, or else a private one secured. If at a public resort, it be one of the kind where some of the guests are uproarious, or keep up music and dancing until a late hour, it is obvious that such a place is not suitable for the treatment of insomnia.

Most cases of insomnia are benefited by residence on the seashore rather than in the mountains. A sea-voyage is an excellent remedy for it. If the unfortunate condition has resulted from nervous strain or chronic dyspepsia, it is dispelled by the removal of the causes which produced it. Many persons of middle or later age do not readily fall asleep, even though they experience no failure in general health. They feel drowsy before bedtime, but the moment their heads touch the pillow they become wide awake; and this condition may continue for two or three hours, without the slightest relief, notwithstanding that they may employ every device to obtain perfect repose. Under these circumstances the sufferer must resist any prompting that he may

feel to relief from narcotics, for the habit of taking them remains, and nature has no opportunity left to resume its power.

The sea exercises a wonderful influences in these cases—either in the form of a sea-voyage or residence in a quiet place on the seashore. It is also beneficial in cases of neuralgia, nervous depression, St. Vitus's dance, gout. A patient has been known to go on shipboard suffering from enlargement of and pains in the joints, disordered digestion, irritable action of the heart, muscular cramps, headache, and insomnia,—a perfect Pandora's box of evils,—who began to improve in health as soon as the steamer was well under way in the ocean's breezes, and whose improved condition continued for months thereafter. Ocean climate is also valuable in certain forms and stages of disease of the heart. In such cases, however, the patient should rely entirely for conduct upon the advice of a physician.

From all that has been here said, the reader should have perceived that what has been called climate is made up of a number of elements, each of which has its individual influence. The climates decidedly detrimental to health are those which are of either a very high or a very low temperature, co-existing with a very high degree of humidity. Moist heat nourishes the germs of infectious diseases. This could, in many instances, be obviated by the drainage of swamps. Many of the diseases characteristic of the tropics are preventible by the resources of engineering and by stringent sanitary precautions. Scientific medical treatment looks forward to a time when, by these means, the present ravages of malaria, yellow fever, and cholera will be greatly abated, if not entirely prevented. In order to effect such an immense change for the better, engineering and sanitary science must work together. Such a great purpose as that indicated cannot, however, be carried forward by private enterprise alone, but must receive the support of government, aided by public knowledge of its inutility and inadequacy without governmental action; for popular ignorance often stands stolidly in

the way of improvement which would be for benefits that would be local and for those also that would affect the whole world.

Almost every man thinks that he is weather-wise, is a good judge of coming weather; but there are only two classes of men who are fair judges of it: those who live constantly in the open, and those who study the weather scientifically. All that has been heretofore said about climatic treatment of health will be reinforced to the reader by some consideration of meteorological facts here subjoined.

The principal characteristics of climate hinge upon the temperature of the atmosphere and the amount of watery vapor that it habitually contains in any given place. The atmosphere may be, for purposes of illustration, likened to a sponge. When it increases its volume by heat,—and its volume is always increased by heat,—and just in proportion to its increase of volume, it is capable of imbibing the vapor of water. If, when it is expanded by heat, and saturated by watery vapor, cold intervenes, it contracts, and the watery vapor is expelled in the form of rain, hail, or snow. If it be not wholly saturated with vapor of water when it is subjected to contraction by cold, its discharged vapor will appear in the form of fog; which is nothing more nor less than a cloud on the surface of the earth instead of in the sky. On Table Mountain, at the Cape of Good Hope, this phenomenon is beautifully displayed in what is there called “laying the table-cloth.” Vapor-laden wind blowing over the cold summit condenses into fog, because the cold of the mountain top condenses it and expels its moisture. Then the fog clears away, and, in time, other vapor-laden air again spreads the table-cloth of fog or cloud; it amounts to the same thing.

When we think of the temperature of a climate, we must consider what the climate is at different seasons. Some climates are what are called “extreme.” They have very hot summers and very cold winters. Other climates are equable. There is in them no very great difference between the temperature of the summer and that of the winter. Again, there are two kinds of

climates in which there is a rainy season, but even they differ very much, from the fact that, in one of them, it rains every day, and in the other, may rain, but again may not rain for several days.

Climates vary very much under the influence of what may happen to be their prevalent winds. They also vary very much as influenced by ocean currents. The Gulf Stream of the Atlantic carries great warmth with it to the northern part of Europe; the Kuro Siwo, or Black Current of the Pacific, carries great warmth from the neighborhood of Japan to the north-western part of the United States. The form of the earth's surface, elevation or depression of ground, character of the soil, abundance or lack of vegetation, the sort of vegetation, the length of the day as compared with the length of the night, the electrical condition of the atmosphere, and perhaps other factors of which we know nothing, constitute, in their diversity and assemblage, what is known as climate.

The great source of heat is the sun. The earth has internal heat, but, in comparison with that afforded by the sun, it is inconsiderable. When the sun's rays fall vertically upon any part of the earth's surface, there it is, for the time, hottest. As at and near the equator, even when the rays are not falling vertically upon it, they are in both seasons falling more nearly vertically upon it than they ever similarly fall upon any other part of the earth, it is always hottest at and near the equator. The sun is not in the center of the ellipse about which the earth travels, and the polar diameter of the earth presents different angles to the ellipse as that diameter travels around the sun. These physical facts together cause the seasons. The northern hemisphere of the earth is turned toward the sun when it is at the greatest distance from the sun, and away from it when it is nearest to the sun.

The summer days, whether of the northern or the southern hemisphere, being longer than the winter days in either, the earth and its atmosphere are, in those regions, and at those times,

in receipt of greater heat than in winter time, despite the fact that the earth is then further from the sun than it is in winter. We are so habituated to thinking of everything as relating to personal affairs, that few people in the northern hemisphere reflect that Christmas comes in our midsummer in the southern hemisphere.

The temperature of a country depends, as might be surmised from what has already been indicated, not alone upon its latitude. It is influenced by its elevation. Look at the case of Switzerland and many other places. The higher we ascend the less dense the atmosphere becomes and the lower the temperature. The diminution in temperature is not perfectly uniform, but it has been found to average about one degree of Fahrenheit in fall for every three to four hundred feet of elevation of ground. Therefore, upon very lofty mountains, a point is at length reached where the moisture deposited from the air has been condensed and frozen, and the peaks remain clothed in perpetual snow. The lowest point at which the condensation and freezing take place is known as the snow line; which is not entirely dependent for position upon altitude, but is modified in position by particular exposure to the sun's heat and the amount of moisture that the air happens locally to contain. The line of perpetual snow is necessarily the highest on mountains situated at the equator. The temperature of a coast is also influenced by the direction of the flow of ocean currents.

Winds, movements of air anywhere, whether in a room or in the open, are generally caused by contiguous bodies of air of different densities. Relative amount of heat and moisture is what makes one body of air more or less dense than another. Being more heated, therefore less dense than another body of air less heated and therefore more dense, the less dense ascends and the more dense supplies its place by flowing in below. Over large areas where the pressure of the atmosphere markedly differs, the atmosphere from the region of high pressure flows to

that of the low pressure region. The direction of winds is modified by the revolution of the earth from west to east.

The atmosphere receiving heat from the sun, and radiation of that from the earth, absorbs all the moisture which it contains from ocean, lakes, ponds, rivers, brooks, or wet lands, upon which the sun shines. It is returned to the earth sooner or later in the form of dew, rain, hail, or snow. Starting from the freezing point of water, the capacity of the air to absorb water is doubled for every increase of twenty-seven degrees Fahrenheit. When the air is unable to contain any more vapor of water it is said to be saturated. The degree of dampness in atmosphere is called the relative humidity of the atmosphere, and, as must be seen, varies with the presence of watery vapor and with the temperature which causes the expansion of the atmosphere. A damp air becomes relatively dry if its temperature is much increased, because with increase of temperature comes increase of volume. A dry air becomes relatively moist when its temperature is much diminished, because with diminution of temperature comes decrease of volume.

When a portion of the atmosphere is filled to some degree with watery vapor, and comes in contact with a colder portion of the atmosphere, the vapor of water becomes visible in the form of fog or cloud, because, as previously explained, the water-laden atmosphere shrinks and can no longer hold its former vapory contents. If a portion of the atmosphere is saturated with watery vapor, and comes in contact with another extremely cold, it so greatly shrinks that rain, snow, or hail immediately falls. What is just described applies to the clouds, but the same agency exists in the case of fog. When a cold portion of the atmosphere comes in contact with the sea or with a moist portion of the earth, a fog arises; or, if it be a warm portion of the atmosphere coming in contact with cold earth, the same phenomenon is exhibited. It is a mere matter of relative vapor and cold. When a fog clears away, or a cloud

dissipates, it is because the heated surrounding atmosphere has licked up the watery vapor of which clouds are composed.

Ocean winds contain a vast amount of moisture, which is readily precipitated in the form of rain or snow. The constant wind from the east that blows over the northern part of Chile, is so robbed of its watery contents by the mountain ranges east of Chile, that no rain falls along its coast near Valparaiso. As a general rule, more rain falls in warm than in cold countries. There are, however, many exceptions to this general rule. Within the tropics the rainfall is greater in the summer than in winter. In the temperate zones it is greater in winter than in summer. In general, it may be said that the rainfall of any region depends upon its prevailing winds, the parts of the earth whence they have come, the formation of the land at which they arrive, and the temperature of the localities which they traverse.

In some parts of the world scarcely any rain falls. This is the case in Egypt, on the coast of Peru, in other portions of America, and on the coast of Africa. In Patagonia, on the other hand, the fall of rain is almost incessant. The southwest winds which blow upon Europe cause a heavy rainfall in those countries which are close to the ocean: Norway, England, Ireland, Portugal, Spain, and western France. In the level tracts of Russia and Germany, annual rainfall is much less than in the countries just mentioned. In western Europe the greater rainfall of the year is in winter. In the interior of the continent, summer is the season of the most abundant rains. In the countries of southern Europe, bordering upon the Mediterranean, more rain falls with a north wind than with a southwest wind. Rain is more abundant in the north than in the south of Italy. Along the northern coast of Africa and in Syria, rain seldom occurs in summer, but is not infrequent in winter. The most abundant rainfall in the United States occurs along the Atlantic Coast and the Gulf of Mexico. The Gulf States and the States immediately north of them enjoy an abundance of rain. The trade-winds, laden with heat and moisture, are somewhat deflected

northward along the Mississippi Valley. From the Atlantic Coast as far west as Missouri, the rainfall throughout the year is quite uniform. On the Pacific Coast the amount of rainfall increases in going from south to north. Along the western slope of California scarcely any rain falls in summer, but quite a large quantity during December. In the State of Washington, on the coast, rain is abundant in the summer. In the region between the Cordilleras and the Rocky Mountains the rainfall is slight.

Hail is produced, just as rain is, by the meeting of a warm cloud-body highly charged with vapor of water with another body of atmosphere or a body of land that is relatively cool, and therefore relatively vaporless; only, in the case of rain, a very low temperature does not coincide with its fall, whereas in the case of the production of hail or snow, the temperature of one of the atmospheric areas must be very low. In Philadelphia, in the spring of 1872, a hail-storm, not lasting over ten minutes, coming from the southward, destroyed over a million dollars' worth of glass in windows and hot-houses. An observer of our acquaintance was interested enough to gather, immediately after the squall (which was severe enough to knock down horses and destroy awnings), a number of hail-stones of several sizes and shapes, and to cut them through various parts in order to ascertain the character of their formation. Very few even approximated roundness in form, and some of them were four or five inches long, and not more than an inch and a half through the middle, tapering off to both ends. More curious, however, than their shape, was their interior construction. They showed, when divided by a knife, at right angles to their length, concentric layers of frozen water lying upon each other just as do the layers of an onion. This proves conclusively that the agency indispensable to their formation must be a cyclonic storm, of some considerable duration in time, in the upper region of the atmosphere, in the whirl of which they are clothed with successive coats of frozen water. Imagining that

he had seen a hail-storm of unprecedented violence and product in size of hail-stones, and happening to meet, a few weeks afterwards, the celebrated meteorologist, Professor Loomis, the observer narrated to him his late experience; but Professor Loomis informed him that he had the record of a hail-storm, in South America, in which the stones that fell were as large as small oranges. Hail storms are of most frequent occurrence in the temperate zones. They are, however, most severe in the tropics.

When the temperature of the atmosphere is at or only a little below the freezing-point, the precipitated moisture of clouds takes the form of snow. Snow consists of a great variety of forms of beautiful crystals, having usually that of six-pointed stars. The numerous forms have been reduced from observation to five typical ones; similar forms predominating in one fall of snow as compared with those of another fall. The largest flakes are produced when the temperature is just at or about the freezing-point. Smaller crystals are produced when the air is drier and colder. These crystals contain air of about ten times their own volume, and for that reason snow is a poor conductor of heat. So it happens that snow is a good protector of the ground, restraining loss of heat by radiation from it. So it also is, that a person, overwhelmed by new-fallen snow, as sometimes happens in the St. Bernard Pass, does not die at once from exposure to cold. The whiteness of new-fallen snow is caused by reflection of light from the crystals of which it is composed. It is from ten to twelve times lighter than the same volume of water.

The phenomenon of red snow was at one time very mysterious. It was known to Aristotle, and is mentioned by Pliny. It has been observed upon the Alps, the Apennines, and the Pyrenees. Captain Ross, in 1819, saw crimson snow covering the cliffs along the shores of Baffin's Bay for a distance of eight miles. The color has been ascertained to be owing to the presence of a one-celled plant of the order of algæ. In 1838,

some French scientists traversed, in Spitzbergen, a field of snow which seemed green when pressed under foot.

Although we are not aware of the fact from our sensations, the atmosphere has weight. It presses with a weight of about fifteen pounds to the square inch everywhere at the level of the sea. This enormous pressure is not perceived by us because it is equal in all directions, inside as well as outside of our bodies. When the equilibrium is disturbed, as it may be by an air-pump, by exhausting all the air of the interior of a light glass cylinder attached to it, the weight of the atmosphere breaks the cylinder with a crash. As we rise above sea-level the pressure diminishes at the rate of a pound for every two thousand feet. The elevation of a country has, therefore, a decided influence upon animal and vegetable life. The effect of lessened atmospheric pressure upon the human body is clearly exhibited in mountain-climbing and in balloon ascensions. At a moderate height a sensation of exhilaration is experienced. At the height of ten to sixteen thousand feet the heart beats quickly, the breathing becomes rapid and difficult, and at a greater height, fainting may occur. On September 5, 1862, Mr. James Glaisher, of England, with a companion, Mr. Coxwell, reached the greatest height that has ever been attained in the atmosphere, thirty-seven thousand feet—that is, seven miles. At the upper part of the flight, Mr. Glaisher became insensible for seven minutes, and Mr. Coxwell came very near succumbing in the same way; for losing all power in his arms and hands, and being obliged to pull the valve-rope in order to release the gas to cause the balloon to descend, he could accomplish it only by grasping the rope with his teeth and jerking upon it three times. Both men were fearfully disorganized, as reported by themselves to each other of sensations experienced, and by Mr. Coxwell of the appearance of Mr. Glaisher. A full account of the twenty-eight ascensions made by Mr. Glaisher is to be found in the reports for 1862-66 of the "British Association for the Advancement of Science." As the atmospheric

pressure is said to diminish by the weight of a pound for every two thousand feet of elevation, it must mean only for the lowest strata of air, for these balloonists went up thirty-seven thousand feet. The pressure of the atmosphere at the point which they reached would, according to the statement unqualified, be less than zero, which is impossible, for at zero the balloon would not have floated. This shows that, as the atmosphere becomes of greater and greater tenuity with ascent, the rule of a pound in pressure lost for every two thousand feet is only applicable to the very lowest strata of the atmosphere, and very roughly even with that fact taken into account; a conclusion which it is very evident must be a true one, even without the demonstration here given. Anyhow, the region which Mr. Glaisher and his companion reached exhibited a tenuity of atmosphere not sufficient in density to support life. One of the pigeons released dropped like a stone, and another one of the pigeons died. It is presumable that part of the salutary effect upon health of a moderate elevation in mountain climate depends upon the slight reduction there of atmospheric pressure. Water, at the level of the sea, boils at two hundred and twelve degrees Fahrenheit, because it is there at an atmospheric pressure of about fifteen pounds to the square inch. But, as the pressure of the atmosphere decreases at the rate of a pound in weight for every two thousand feet of a mountain side (roughly so, as just demonstrated, and only for heights inconsiderable as compared with those which Mr. Glaisher reached) water boils at a lower temperature, in proportion to the height of a point reached. Consequently, to cook anything to the proper degree at a very great elevation, it must be cooked much longer than it would be at the level of the sea. A few years ago, a couple of travelers, at a great mountain height, stopped at a hostelry, and said to mine host: "We are in a great hurry; let us have a snack, right off, a couple of eggs and some bread and butter." "All right," said mine host, "but if you must have boiled eggs, you'll have to wait seventeen minutes." "Seventeen minutes!"

exclaimed the travelers, "to boil eggs?" "Yes, gentlemen," replied mine host, "You forget how high you are."

The most prominent features of a landscape are generally mountains, hills, forests, and various bodies of water—lakes, rivers, and brooks. Differences among these various features influence the character of a climate. Furthermore, the character of a soil is influential in the kind of atmosphere present. Mountains, and especially chains of mountains, act both as collectors and distributors of water. Mountain air is pure, cool, and dry. The water which the mountains absorb is ultimately collected below in springs, which are the sources of rivers. Even where there is a perpetual line of snow, glaciers eventually bring the snow down to the melting levels, so that water received first in the form of snow, then converted into ice, finds its destination sooner or later below for purposes of navigation and fertilization within a continent.

The comparative absence or lack of water in a region has great influence upon climate, for it has effect both on temperature and humidity of the air. Water communicates moisture to the atmosphere and absorbs heat from it. Water absorbs heat reluctantly and parts with it reluctantly. For these reasons its presence tends to make the temperature of a place equable, thus moderating the heat of summer and the cold of winter. There is a physical law regarding matter with relation to heat which every one should know. Whatever substance absorbs heat readily, radiates it readily; whatever substance absorbs heat reluctantly, radiates it reluctantly. The latter case is conspicuously exhibited by water. Take the case of sand, for exhibition of the opposite action. On the beach at noontide on a hot day the sand is so hot as to be scarcely bearable by the hand plunged into it; but in the night, in the same place, it is remarkably cool. Bricks absorb heat with the greatest ease from the sun's rays and radiate it intensely for hours afterwards in the shade.

Collections of water in which there is but little movement of current, and those in which there is none at all, which

are, in fact, stagnant, diminish the salubrity of the air. Stagnant water is full of the growths of low forms of vegetation, accompanied with decay. Malarial fevers prevail where the ground is so covered in any great degree. The higher class of vegetation, on the contrary—trees and forests—is salubrious, protecting the ground from undue heat, distributing the water supply of a country equably. Besides, the leaves of trees decompose the carbonic acid in the air, appropriating to their life the carbon and setting free the oxygen in it, which is therefore abundant in the air of woods.

A certain part of the oxygen liberated is, moreover,—especially among the pines and other cone-bearing trees,—converted into a form of atmosphere known as ozone. Ozone is a peculiar modification of oxygen. It possesses energetic purifying power and health-giving influence. A trace of it is usually present in country air. It is found particularly in pine forests and in sea and mountain air. It is developed by thunder-storms. Its existence had long been known before its nature was discovered. It can be produced by the working of a static electrical machine; the odor produced by it being very marked and peculiar. A distinguished German scientist points out the curious fact that its sulphurous smell, produced also by lightning, is mentioned in four passages by Homer. It was observed by the ancients that a forest situated between a tract of swamp and a city protected the city from malaria. This must have been because the generation of oxygen and ozone by the forest, combined with the prevalent wind, dissipated the malarial poison. An extremely great improvement has been made of late years in the neighborhood of Rome by planting eucalyptus trees around the swamps in the vicinity.

Destruction of forest trees beyond a certain point renders the atmosphere of a country so dry as to bring about droughts. In the United States the wanton cutting down of trees, and their wholesale destruction for timber has led at last to restrictions under forestry laws. The establishment of Arbor Day is leading

the minds of the people to some just appreciation of the necessity of arboriculture. Trees conduct heat slowly, and therefore do not gain and lose heat so rapidly as does the air. They do not reach their highest and lowest degrees of temperature until some hours after the surrounding atmosphere has reached its highest and lowest points of heat. For this reason forests make the nights warmer and the days cooler than they would be without their existence. The density of the air under the forest's growth being, in the daytime, on account of its lower temperature, greater than that of the surrounding country, the surrounding air flows into, and the forest air out of the trees, thus making a breeze. Almost everyone must have noticed how, even on a calm, hot day, a little breeze is to be found on the edge of woods. Climate is affected, as already said, by soil. The reason of the fact is that soils are of different physical and chemical characters, and also are more or less absorbent of water. The atmosphere is chiefly warmed by radiation of heat from the earth's surface, not directly by the sun's rays. The atmosphere which is in contact, and which is nearest to contact, with the earth, is therefore warmer than that further away from it. Deserts are hot by day and cold by night, the heat received during the day having largely radiated from the sand at night. Loam and clay not being conductors of heat so good as sand is, they receive heat slowly and part with it slowly. So, these soils are neither so hot by day nor so cold by night as a sandy soil is.

The atmosphere contains free electricity. The amount of it present varies in different regions and at different times. The electrical tension increases with elevation above the surface of the earth. It varies anywhere with the time of day. Soon after sunrise, and soon after sunset, there is an increase in the electrical tension; whereas, shortly before sunrise, and in the afternoon, during the warmest part of the day, a diminution in it is observable.

CHAPTER XV.

VENTILATION.

THE atmosphere is a mixture, not a chemical combination, of the two gases called oxygen and nitrogen. They form the atmosphere in the ratio to each other of nearly four parts in volume of nitrogen to one of oxygen. Gases mix, in certain proportions, with one another so intimately, that in the case of the atmosphere, it is steadily constant in the character described. Both the oxygen and the nitrogen maintain, when mixed, their own physical and chemical properties unaltered. Their combination is merely the association of their respective molecules. This has been demonstrated by a number of experiments. The office of nitrogen in the atmosphere is simply the dilution of the oxygen there. It is not poisonous, but it is incapable of supporting animal life. Oxygen, on the other hand, although in its atmospherically diluted state indispensable to life, by itself rapidly exhausts vitality. It is of all the elements most abundant and important and, as diluted by nitrogen, perfectly fitted for sustenance of life.

It is known from chemistry that the three forms of matter, solid, liquid, and gaseous, depend for their constitution upon associated degrees of heat and pressure. The application of heat readily converts many liquids into the gaseous condition. The abstraction of heat, and the application of great pressure, converts gases into liquids. Many gases have, in this way, been converted into solids. Water freezes into ice, and may evaporate in the form of vapor. Chemists have lately succeeded in abstracting heat and compressing air to so great a degree as to make it liquid. A distinguished Swiss chemist has since discovered a method of preserving liquid air in great quantities. It is anticipated that this discovery may lead to important revelations in physics and chemistry.

In an interesting article upon the subject of the atmosphere, an English chemist asserts that its composition is still slowly undergoing change, there being now less carbonic acid in it than there was fifty years ago. In the early period of vegetation of the earth, when gigantic lower forms of vegetation, ferns, etc., were produced, now only fossil, the atmosphere was heavily charged with carbonic acid.

The atmosphere which surrounds the earth is analogous to its oceans below. The atmosphere, as already said, is composed of two intermingled gases, oxygen and nitrogen. Water everywhere is composed of the two gases, hydrogen and oxygen. But there is this difference between them: that, whereas the atmosphere is a mechanical mixture of its two gases, water is a chemical mixture of its two gases.

All animals, even aquatic ones, breathe atmospheric air, and cannot dispense with oxygen to support life. The fish, when removed from the water, dies, because its anatomical apparatus of gills is not competent to utilize in the air the oxygen of the atmosphere which it obtains in the water. Man and the lower terrestrial animals immediately perish in water because they are not able there, when submerged, to utilize the oxygen which is there chemically combined to form water and also free in atmospheric form; for in water there is a certain amount of air, as anyone can easily perceive by boiling water, which, without that air, becomes insipid, what is called flat to the taste. Amphibious animals live in either element, air or water, but they breathe in the air. Seals come to the surface to breathe, so do crocodiles, alligators, porpoises, and whales. But seals, porpoises, and whales are not amphibious and not in any respect like fish. It comes to this, however, that all animals—man, the terrestrial lower animals, the aquatic, the amphibious, all require oxygen to enable them to live.

A current of air, being a current, resembles a stream of water. The flow of air, which, when rapid, we call wind, is regulated and directed in the open country in the manner elabor-

ately described in the last chapter. What we now have to do with in this chapter is that limited species of flow which depends upon differences of density in different bodies of air in proximity to each other, upon which depends our ability to ventilate houses in the interest of health. As it is so pervasive, from the fact of its constitution as a gas, interchange among its parts takes place through crevices of all sorts in the rooms of a house. Such ventilation as that, however, which takes place to greater or less degree in the habitations of mankind, simply perforce of the constitution of air, is very far from being that which is prescribed by reason, upon the basis of experience, supported by scientific knowledge.

The occupation of an apartment by human beings is accompanied by their discharge into it of the waste of the body, chiefly from their lungs, which waste is called carbonic acid gas, a deadly poison to animal, but the food of vegetable life. If the occupation of the apartment by human beings be accompanied by the burning of lights, the accumulation of carbonic acid gas in it is increased, for the oxygen of the air is burnt out of it to feed the lights. Oxygen, in a word, will not burn, but it is oxygen only that supports combustion. Carbonic acid gas, on the contrary, not only does not support combustion, but depresses it. Go into a place charged with it, holding a lighted candle. The light burns dimly. Subject a flame to pure carbonic acid gas, and it is at once extinguished. So, carbonic acid gas is fatal to the light of life and to the light of flame. This is no mere play of words upon the word "light," the phenomenon of animal life, at any intensity, is analogous to light, because it is supported in the same way as is flame, by oxygen. What men see, they are always, if it be found dangerous, on their guard against; but in this case, they cannot see. Nothing more prevalent is found among mankind than the notion that seeing is believing, and only seeing.

In order to avoid having in apartments this death-dealing carbonic acid gas, it is necessary for health to have ample means

for the ingress and egress of air from the outside of a building. In winter, supposing a house to be artificially warmed, even to some slight degree, open fire-places and chimneys carry off a great deal of impure air. In summer, however, as it is generally hotter outside of a house than inside, those means of getting rid of impure air are then of no avail. No matter, however, in what way, at the cold season, impure air may be got rid of, it is important that the source of supply which replaces its lost volume shall be pure.

The summer ventilation of a house must rely chiefly upon opening doors and windows, and this be supplemented with the air-shafts which are now introduced into the best constructed houses. The outside air is generally in large movement, and its pressure on the various vents of the house, whether open door, windows, or outside openings of air-shafts creates ample ventilation. The use of open doors and windows for part of the ventilating apparatus of a house needs only be coupled with discretion, based upon slight knowledge from experience that avoids draughts. Two windows opposite each other ought not to be raised. The best plan in utilizing windows for ventilation is to choose two lying at an angle with one another, and to raise the bottom of one and lower the top of the other. As the air at the top of a room is always hotter than at any place below, air will flow by this arrangement out of the lowered top of the window and its volume be supplied by air flowing into the raised window.

With abundance of bed-clothes for warmth, it is an excellent plan for health to sleep, out of draught, with a window half open, even in the winter time. But here discretion has an opportunity for its display. The plan of having the window half open depends upon circumstances. If it be blowing half a gale directly against the window, its raising by three or four inches will give more air to the room than it would receive half open in a calm. Again, suppose that the outside temperature be barely freezing and the time calm, the window may with prudence be

raised high; but suppose, on the contrary, that the temperature be at zero or below, the window need not be raised so much to effect the same ventilation that it does at higher temperature with widely opened sash. Why? Because the great density of the atmosphère of the outside, at or below zero, with relation to the density of the atmosphere of the room and house causes the same change of temperature as before at the expenditure of less volume of air. With transoms, air-shafts, doors, and windows, we have at hand, aided by a little common sense, ample appliances in the best constructed houses for ventilation and the maintenance of health. In public halls, air is sometimes supplied by gratings in the floor. This is an objectionable device, for it permits of the introduction of foul air. Upright flues, in communication with the external atmosphere, are a much better system. With open gratings near the ceiling, those make a perfect apparatus. Covers for the ceiling openings, found in public and private structures, prevent any downward tendency that may on occasions arise from pressure of wind outside the building.

From the air drawn into our lungs is abstracted the oxygen which oxygenates and renovates the blood, rendering it a carrier of life to all parts of the body. The air which we exhale is laden with carbonic acid gas and other effete matter. A small amount of carbonic acid gas is always present in the atmosphere of the country, a larger amount of it in that of cities. The contamination of air by it by more than one part in a thousand is prejudicial to health. It has been calculated that the air of large cities contains, on an average, about four parts of carbonic acid gas in one thousand parts of air. In the country, and in small towns, the percentage may not be greater than half or three-quarters of this amount. An adult discharges from the lungs, in breathing, one part of carbonic acid gas for every ten thousand parts inhaled. For a room, at least one thousand cubic feet of fresh air are hourly needed for each person's use, in order to maintain the air at a healthful standard of purity.

In apartments where many persons are assembled, as in theatres, halls, workshops, and cars, the quantity of fresh air hourly received should be even more than the preceding amount. The demand for fresh air is especially pressing in the wards of a hospital.

To those occupying a room during the pollution of its air by breathing, the change, being gradual, may not be apparent; but it is recognized at once by a person coming from the fresh air of outdoors, who at once pronounces it close. This is the true application of the word "close." Some persons speak of a room which is merely too warm as "close," but closeness in a room means the condition produced by a large amount in it of carbonic acid gas, perceived by the sense of smell. The sense of smell detects its presence although carbonic acid gas is odorless. It is therefore clear that it must, to excite the sense of smell, be associated with other matter when it is thus perceived; which conjunction effects the result. Burning illuminating gas in a room adds largely to the excess of carbonic acid gas in it; the flame, nourished by the oxygen of the air, causes the oxygen to disappear, and leaves in its place carbonic acid gas and other products of combustion.

In a small room the breathing of an adult makes it unfit for occupation in a very short time unless fresh air is entering. It has been scientifically demonstrated that carbonic acid gas exhaled from the lungs is much more injurious than the same gas introduced into a room for experimental purposes. This proves that the carbonic acid gas is not the only waste product of the body eliminated by the lungs; which product, being waste, is injurious to the human or any other animal organism. In addition to the exhalation from the lungs, that from the skin must be taken into account. The perspiration contains organic waste matter which, having been rejected by the system as waste, is unfit to be taken into the system by the organs of respiration.

Danger from carbonic acid gas poisoning is not the only

indictment that can be made against foul air. The microbes which generate disease in the human body flourish in foul, but not in pure air. Experiments have shown that, even in the best ventilated school-rooms, the number of microbes far exceeds those found in the open air. In ill-ventilated public institutions, the number becomes enormously increased. It is no wonder that contagious diseases are so often contracted in the school-room. These microbes retain their vitality for an indefinite time. In badly-ventilated school-rooms they cannot be dislodged by occasional airing. There are, moreover, many affections not considered contagious, which are produced by these minute organisms. The evil of close rooms, therefore, it is perceived, is caused by slow poisoning from carbonic acid gas together with the presence of disease-bearing microbes.

Persons who habitually live in close rooms suffer from languor, headache, nervousness, and other ills, without being aware of the cause. Their breathing, in the neglect of exercise, is shallow. They are less well-nourished than those persons are whose lungs inhale an ample supply of oxygen. Their appetite is poor, digestion weak, muscles flabby, blood impure, nervous system unstable, and its whole resistant power to disease undermined.

Habitual respiration of impure air has a bad influence upon the health of the skin, and therefore upon the goodness of the complexion. The fact cannot be too strongly insisted upon, that the beauty of the skin depends entirely upon the purity of the blood. If ventilation be inadequate, impurities must accumulate in the blood. The skin then loses its bloom and acquires a yellowish hue. It also becomes dry and loses some of its smoothness and elasticity. It often becomes the seat of pimples and blotches. Even brownish patches are apt to appear upon the skin. There is in the body an increase of waste-products, while its power of removing them is all the time diminishing. Again, such feeble and unhealthy skin offers no resistance to the growth of parasitic microbes of the fungus type, which produce the

fawn-colored patches of discoloration. When softness, smoothness, healthy color of the skin have been lost, even without its invasion by pimples or patches, the essential elements of beauty of complexion have disappeared. Advantages of personal looks depend so closely upon obedience to the laws of health, that those laws cannot be long transgressed without impairment or loss of bodily charms.

Charles Dickens, although he was no scientist, was a keen observer from whom very little escaped to which he gave his attention. Observe what he so forcibly describes as one of the effects of need of ventilation in his novel of "Our Mutual Friend." He is describing a school-room of nearly asphyxiated children. "The school at which young Charley Hexam had first learned from a book was a miserable loft in an unsavory yard. Its atmosphere was oppressive and disagreeable; it was crowded, noisy, and confusing; half the pupils dropped asleep, or fell into a state of waking stupefaction; the other half kept them in either condition by maintaining a monotonous, droning noise, as if they were performing, out of time and tune, on a rude sort of bagpipe. The teachers, animated solely by good intentions, had no idea of execution, and a lamentable jumble was the upshot of their kind endeavors. . . . And particularly every Sunday night. For then, an inclined plane of unfortunate infants would be handed over to the prosiest and worst of all the teachers with good intentions, whom nobody else would endure. Who, taking his stand on the floor before them, as chief executioner, would be attended by a conventional volunteer boy as executioner's assistant. When and where it first became the conventional system that a weary or inattentive infant must have its face smoothed down with a hot hand, or when or where the conventional volunteer boy first beheld such system in operation, and became inflamed with a sacred zeal to administer it, matters not. It was the function of the chief executioner to hold forth, and it was the function of the acolyte to dart at sleeping infants, yawning infants, restless infants, whimpering in-

fants, and smooth their wretched faces; sometimes with one hand, as if he were anointing them for a whisker; sometimes with both hands, applied after the fashion of blinkers. And so the jumble would be in action in this department for a mortal hour; the exponent drawling on to My Dearerr Child-errener; let us say, for example, about the beautiful coming to the sepulchre; and repeating the word sepulchre (commonly used among infants) five hundred times, and never once hinting what it meant, as an infallible commentary; the whole hotbed of flushed and exhausted infants exchanging measles, rashes, whooping-cough, fever, and stomach disorders, as if they were assembled in High Market for the purpose."

In the month of June, in the year 1756, the English garrison attached to the factory at Calcutta, India, was over-powered by the natives, whose leader imprisoned the captured, one hundred and forty-six in number, in a little room eighteen feet square, with two little iron-barred windows, since known as "The Black Hole of Calcutta." On the following morning only twenty-three had survived their imprisonment, and of these, some died of what was called in those days "putrid fever," but which is now known as "blood-poisoning." In the tropical climate of Calcutta it is very hot in June, and doubtless heat contributed to the loss of life; but that blood-poisoning, from carbonic acid gas, was the chief cause, seems to be clearly shown in the death of some of the survivors of the night.

The Icelanders dwell in low huts entirely destitute of special provision for ventilation. One opening serves the common purpose of window and chimney. An entire family usually has but one room for all purposes. Not only is it the living room of the family, but in winter it sometimes accommodates sheep. The conditions are so unfavorable to health and life, that although the air of their island is noted for its purity, the population of Iceland is either stationary or diminishing in number. Nearly two-thirds of the infants born die before their twelfth day, of a convulsive disease like lockjaw. A particular form of

lockjaw (lockjaw is medically called tetanus) is known to physicians as *trismus*. The coincidence of this disease with defective ventilation was demonstrated in 1789, by Dr. Joseph Clarke. In the year 1783 nearly every child in the lying-in hospital of Dublin died within the first fortnight. Nineteen out of twenty deaths were caused by tetanus. A new system of ventilation was then installed, and in the succeeding ten years the number of deaths had fallen to one in nineteen.

In the United States, *trismus* is seldom met with except among careless negroes and the lowest class of our white foreign population, herded in the tenement houses of our large cities. It is very prevalent on the island of St. Hilda, one of the Western Hebrides. According to a visitor there, in 1838, no less than four out of every five infants died from the disease between the eighth and twelfth days of their existence. He wrote: "The great, if not the only cause of this mortality, was the contamination of the atmosphere by the filth among which these people lived." Iceland, here just spoken of in another connection, is depopulated by severe epidemics which happen almost every year. The inhabitants are especially liable to scurvy and elephantiasis, which latter disease attacks the feet, increasing them so enormously as to cause them to be likened to those of the elephant.

Oxygen has to do with the processes of nutrition, waste, and repair of the body. By combination with disintegrated tissue, with the blood, and with elements of the food, oxygen produces an effect which, being fundamentally the same as combustion, is bodily heat. That is, however, oxygen as we breathe it, diluted as it is in the atmosphere with four times its volume of nitrogen. Pure oxygen, remember, not only will not support vitality, but destroys it. When you read of patients being given oxygen for a last struggle for life, they are given it in moderation as increment to that already in the atmosphere.

The symptoms of asphyxia from carbonic acid gas poisoning are violent inspiratory efforts (struggle to draw in the

breath), followed by violent expiratory efforts (struggle to expel the breath), by convulsions, and by speedy death.

Exercise strengthens the muscles of respiration, increases the capacity of the chest and of the lungs, and demands an increased amount of oxygen for the body. During the hours of sleep, ventilation of the kind which has been here described secures an ample supply of it. The meaning of ventilation, stated in the simplest possible terms, is exchange of foul air for pure air. Atmosphere heavily laden with carbonic acid gas and other deleterious products of the human organism, from lungs and skin, is exchanged for a pure supply. Provision must therefore be made equally for the removal of foul and the entrance of pure air. If this be not done, health must suffer, vigor fail, and disease await the neglectful. It is very important that school-rooms should be well ventilated, that no injurious physical condition be present among children. Youth is the only time when the foundation of health and strength can be laid. There are even cases where a delicate or even sickly boy or girl can, by prudential measures, establish for life some degree of health and working and pleasure capacity. Examples occur in which weakly men and women, by pertinaciously living sanitary lives, reach extreme old age. They never feel the intensive life of the robust, but they live equably on the low level to which they are assigned by nature and which they maintain with care. It is, however, the sturdy boy or girl who, with equal care, grows into the vigorous man and woman in full enjoyment of all that life can impart.

If plentiful supply of fresh air be so desirable as it is for healthy constitutions, it is even more requisite when disease is threatening or established. It removes the morbid exhalations from the sick-room, influences favorably the condition of the patient, and diminishes danger of infection to others. Consumption, for instance, is not the invariably fatal disease that it used to be regarded. There are now, under improved methods of treatment of the present day, a large percentage of cases where

the disease is arrested in its progress, and sometimes radically cured. Certain drugs which promote the nourishment of the body have a share in producing this result, but no medical treatment can avail unless it be accompanied by adequate oxidation of the blood by pure air. Simultaneously, the digestive and respiratory functions are carefully studied by the physician, and exercise and ventilation in the house insisted upon by him as indispensable to treatment.

In all fevers, especially when prolonged, it is essential that the sick room should be well ventilated, for fever causes active destruction of the tissues of the body. The popular notion of fever as a sort of fire is quite correct. The exhalations thrown off by the body must be removed by a gentle flow of air through the sickroom. Perfect ventilation is imperatively demanded in typhoid fever on account of its duration, and the eruptive fevers require equal care. Ventilation is needed in scarlet fever and measles, and in all cases it is incumbent upon the person who has it in charge that a patient shall never be exposed to a draught. In small-pox, purification of the air of the sickroom is of the most urgent necessity for the sake of the patient and that of other persons.

The essence of hygienic rules is given by a medical writer as follows:—

“Cleanliness covers the whole field of sanitary life. Cleanliness, that is, purity of air; cleanliness, that is, purity of water; cleanliness in and around the house; cleanliness of persons; cleanliness of dress, cleanliness of food and feeding; cleanliness in work; cleanliness in habits of the individual man and woman; cleanliness of life and conversation; purity of life, temperance, all these are in man’s power.”

CHAPTER XVI.

DISFIGUREMENT FROM DISEASE, WITH SOME TREATMENT FOR IT.

COMPLEXION, a word which is usually made to refer only to the qualities of the skin of the face, is one which by rights may refer to the whole body. Complexion depends upon the uniformity of the delicacy and translucency of the true skin and the scarf-skin, the condition of the blood, and of the nervous system. If any one of these elements be defective or disturbed, complexion is seriously marred. Individual differences exist in the thickness of the true skin and in the smoothness and lustre of the scarf-skin, and upon these depend the range of beauty inherent in the normal skin. The color of a thick and harsh skin cannot, of course, equal that of a thin, soft, and delicate one. If the blood appreciably departs from its healthy standard, the skin must show loss of color. If the nervous apparatus which governs the circulation and the secretions of the body be disordered, the changes of hue in the skin in response to emotion must be diminished. The beauty of the skin is, in a word, affected by a number of causes, constitutional and acquired.

CONSTITUTIONAL CONDITION OF THE SKIN.

A constitutional condition of the skin which is congenitally low is associated with invalidism, to which attention is much more naturally directed than to anything bearing upon the looks of the patient. The paleness of consumption, accentuated by the well-known hectic flush on the cheeks, is ineradicable. There is a disease in which the lymphatic glands, the spleen, and the marrow of the bones produce white corpuscles in the blood to an inordinate degree, and the skin, in consequence, assumes a very peculiar yellowish hue. In cases of illness associated with long

and profuse discharge of matter, the blood becomes changed and various organs of the body undergo a characteristic form of degeneration. The existence of a certain other systemic malady is accompanied by the bronzing of the skin. Imperfect action of the liver is characterized by a sallow complexion.

PALLOR.

Anæmia is the name given by the medical profession to the condition of the body in which there is an abnormal reduction of red corpuscles in the blood. It may be due purely to constitutional disease, or to an insufficient or improper supply of food, or perhaps to dyspepsia. Nervous influence, such as fear, may occasion anæmia. Dr. Wilkes writes: "I have seen now so many cases of anæmia, some of them fatal, occurring upon a severe shock of the nervous system, that I have no doubt of the fact." In anæmia, the digestion is poor, the extremities low in temperature, the heart feeble and irregular in pulsation, the movements of the body languid. It is of more frequent occurrence in women than in men.

GREEN-SICKNESS.

A peculiar form of anæmia, occurring in young girls, is known medically as *chlorosis*, a word which means "green-sickness," in reference to the peculiar greenish tint which the skin assumes. *Chlorosis* is prevalent, or used to be, at girls' boarding-schools. The remedial measures which should be adopted for it consist in removal from school, generous diet, exercise in the open air, and general change of habits; also the employment of tonics, especially iron. The appetite should be pampered, and animal food eaten to a proper amount.

BILIOUSNESS.

When the liver is torpid, the skin and the whites of the eyes become yellowish. With certain persons the condition is chronic. The breath may have so bad an odor as to be discern-

ible even by the sufferer. The bowels are generally constipated, only occasionally relaxed. In the course of time the complexion becomes impaired. The persons so afflicted must be careful in diet and exercise. They must not lavishly indulge in fats and sweets, and animal food must be eaten in moderation. Malt and spirituous liquors are always bad for such cases. Walking and horseback riding are very advantageous in them, also bathing. In all cases of biliousness, it is important that the bowels should be kept free, not by purges, but by gentle purgatives when necessary. Best of all for such cases is the employment of some laxative water. Saratoga, Vichy, Friedrichshall, Hunyadi-Janos, or Carlsbad salts. The fluid extract of cascara sagrada, taken in half teaspoonful doses at night, two or three times a week, serves a good purpose.

YELLOW DISCOLORATION OF THE SKIN (JAUNDICE.)

Jaundice visits the skin with a color varying from that of sulphur, orange, or saffron, even to that of olive. This discoloration pervades not only the skin, but the deeper tissues of the body, the secretions, and the excretions. Patients feel weak, spiritless, have coated tongues, no appetite, and often have nausea. The pulse is generally very slow and headache is experienced. The temperature is sometimes below normal, and drowsiness present. The commonest cause of jaundice is obstruction of bile from the liver on its way to the intestinal canal, which leads to the bile being carried into the circulation, just as, in another case, a gall-stone somewhere in the common duct of the liver forms an impediment to the release of bile in the natural way, and in consequence it enters the circulation. Gall-stones are of most frequent occurrence in and after middle-life. They are more frequent in the female than in the male sex. They are more common with fleshy than with thin persons.

The passage of a large gall-stone along the common duct of the liver is productive of extreme pain, called hepatic or liver colic. When the stone reaches the bowel, the pain rapidly sub-

sides, leaving some tenderness, and the jaundice gradually disappears. The passage may be closed by inflammatory obstructions, which make a prolonged, perhaps permanent, jaundice. If this condition cannot be removed, death takes place at a period varying from three months to two years. Chronic inflammation of the stomach, chronic gastritis, may ultimately lead to jaundice by communication to the mucous membrane of the small bowel in the neighborhood of the orifice of the common duct of the liver; the duct itself may become involved.

In jaundice the diet of the patient must be regulated. Sugars and fats must be avoided. The patient should live upon skimmed milk, fish, oysters, stale bread or toast, the more easily digested vegetables, and strictly avoid fermented and distilled liquors. The bowels must be kept free by the mineral waters previously named, or by Epsom or Rochelle salts, or seidlitz powder. In the phosphate of soda we possess a laxative of special efficiency in this affection now being discussed. It is given in drachm doses three times a day, dissolved in a little water flavored with syrup of orange, or it may be taken in Apollinaris or Vichy water. Phosphate of soda has a mild, laxative effect.

Another medicine, of quite an opposite chemical character from phosphate of soda, is of decided usefulness in relieving the catarrh which occasions jaundice. It is hydrochloric acid. This, in a diluted form, improves digestion, diminishes fermentation and flatulence, and favors the escape of bile into the intestine. The dose of the standard dilution is ten drops three times a day, in plenty of water, and the teeth afterwards rinsed with water, or with salt and water, or with a solution of bicarbonate of soda. The injection of cool water into the bowel is advantageous for relieving the catarrh; the temperature from sixty to sixty-five degrees Fahrenheit, the operation performed once a day. In chronic cases, the application of galvanic electricity has proved of much advantage.

If there is reason to believe that the jaundice is of malarial origin, the administration of quinine and its associated remedies

in malarial poisoning is indicated. In such a condition good results are obtained by a combination of iron, quinine, and arsenic in the following pill or capsule:—

Sulphate of quinine	24 grains.
Dried sulphate of iron.....	24 grains.
Arsenious acid	1 grain.

Mix and make into twelve pills or capsules. Take one three times a day.

The passage of a very large gall-stone along the duct gives rise to excruciating pain, which may be alleviated, in some measure, by a mustard plaster or by a warm flaxseed poultice applied to the abdomen, or by putting the patient in a warm bath. It is, however, generally necessary to still the pain by administering a dose of opium. A twenty- to a forty-drop dose of laudanum may be given, but on account of laudanum's rapidity in effect and power, a physician preferably resorts to a hypodermic injection of the proper dose of morphine. It is sometimes found advisable to cause the patient to inhale ether or chloroform. An anaesthetic, however, should be administered only by a physician. It is not necessary that complete unconsciousness be produced. The physician best knows what degree is desirable.

Constipation so extreme as to cause jaundice calls for special treatment. The food of the patient should be nutritious and digestible. Fruits, cracked wheat, graham or bran bread are good for the purpose. If the diseased condition has existed long, it is necessary to administer a brisk purgative and give an injection of cool water. When the constipation is habitual, and there is reason to believe that the muscular coat of the bowel has become weak and relaxed, a pill composed of a purgative and a tonic constituent is efficient, and is better than a frequent resort to saline purgatives. Such a combination is the following:—

Compound extract of colocynth.....	1 drachm.
Extract of belladonna.....	2 grains.
Sulphate of strychnine.....	½ grain.
Powdered cinnamon	20 grains.

Mix and make into twenty pills. One pill every night at bedtime.

A pill prescribed by Sir Andrew Clarke is composed of :—

Aloin	$\frac{1}{2}$ grain.
Extract of belladonna.....	$\frac{1}{2}$ grain.
Dried sulphate of iron.....	$\frac{1}{2}$ grain.
Extract of nux vomica.....	$\frac{1}{2}$ grain.
Powdered ipecac	$\frac{1}{2}$ grain.
Powdered myrrh	$\frac{1}{2}$ grain.
Soap	$\frac{1}{2}$ grain.

Mix. For one pill—take a pill an hour before last meal should the bowels not act during the day.

YELLOW DISCOLORATION OF THE SKIN (JAUNDICE) CAUSED BY EMOTION.

A number of cases showing the intimate connection between mind and body have been medically reported. A young friend of Dr. Tuke's had a severe attack of jaundice which could be traced to nothing else than his anxiety as to passing a pending medical examination. Dr. Anthony Todd Thompson states that a young man in Paris became suddenly jaundiced from alarm at having a musket pointed at him, was taken to the hospital and died. Dr. Budd, an eminent authority on diseases of the liver, observes that jaundice following mental shock, or long-continued anxiety or grief, is often unattended by any alarming symptoms, but adds: "Now and then, after it has existed for some time without any symptoms indicative of especial danger, disorder of the brain, which proves rapidly fatal, comes on." Professor Potain mentions the incident of two duellists, one of whom, as he crossed swords, became so suddenly jaundiced, that his adversary dropped his weapon in amazement. He likewise cites the case of a man who, feeling very well when he arose in the morning, began to shave, but who, being handed a letter containing bad news, read it, and upon resuming his shaving, found that he had turned yellow. He cites also the case of a woman whose husband was made prisoner by the Paris Commune when in revolt against the government, and who suddenly turned yellow as she saw the platoon of the firing-party take aim at him. He also relates the case of a very ner-

vous and irascible woman who became jaundiced while in a violent fit of anger.

ACUTE YELLOW ATROPHY OF THE LIVER, OF NERVOUS ORIGIN.

There is a very severe and rapidly fatal disease known by the above title. In it, the liver shrinks and becomes disorganized. The progress of the disease is attended by nausea, jaundice, excitement, delirium, or stupor, convulsions from stomach and bowels, and eruptions upon the skin. According to Dr. Murchison it may be produced by emotion, especially anxiety, fear, and grief. Sir Thomas Watson observes that scores of cases are on record where jaundice has suddenly appeared under such circumstances, and he adds that "these cases are often fatal, with head-symptoms, convulsions, delirium, or coma supervening upon the jaundice."

DIABETES.

This grave malady is characterized by excessive thirst and, in many cases, by an inordinate appetite. Boils, carbuncles, tetter, and ulcers are common during its progress. In many cases it occurs as the result of nervous shock, anxiety, or mental strain. Hereditary derivation is often recognized in its cases. An instance is cited where a man, fifty-seven years of age, whose father had died from diabetes, was seized with diabetes owing to the shock that he received from his daughter's committing suicide.

CONTAGIOUS DISEASES.

It has been positively proved that many, and it is now believed that all, contagious disorders are due to the development of certain microbes, which are microscopic fungus organisms. A certain microbe is the known exciting cause of diphtheria, another of cholera, another of erysipelas, another of consumption. It has been fully proved that fear contributes to the spread of contagious diseases through its depressing influence upon vitality. Fear, anxiety, and grief are known to be capable

of precipitating attacks of yellow fever or of cholera. So clear is the evidence that certain cases of cholera are known as "emotional cholera." Dr. Rush, of Philadelphia, recognized this fact as long ago as 1783, during the epidemic of yellow fever there. Sir Samuel Baker, in his work "Albert Nyanza," speaking of his experiences in Africa, says: "Any severe action of the mind, such as grief or anger, is almost certain to be succeeded by fever in this country, just as full occupation of the mind was found to act as a prophylactic against it."

DISEASES OF THE SKIN.

As the skin is richly supplied with blood-vessels and nerves, and as its circulation is affected by emotional causes, it is not surprising that many disorders follow mental excitement. Some of these affections, as, for instance, nettlerash, betray, from the circumstances of their abruptness of coming and going, the influence that the nervous system has in their creation. Sudden outbreak of tetter, groups of blisters, pain or itching, point to the influence of the nervous system. Sudden fading of erysipelas on one part of the body, and its equally sudden appearance on another, perhaps in a corresponding situation on the opposite side of the body, demonstrate that the attack is derived from nervous conditions.

In more chronic examples, slower in onset and more gradual in progress and departure, physicians have learned that these too are often connected with nervous disturbances. When the skin loses its proper nervous tone, it is liable to be assailed by a number of affections, some of which may be enumerated: tetter, redness, blisters, hardening ulcers. Disorders of the nervous system may likewise produce alterations of the thickness of the skin, anomalies of the secretory functions, and changes in hair and nails.

GROUPS OF BLISTERS.

The little blisters that sometimes appear upon the lips, popularly called "cold-sores" or "fever-blisters," are often due to

general nervous depression or indigestion. In that form of the disease popularly known as "shingles" nervous causation is very apparent. It is accompanied by pain of neuralgic character. It may come as a consequence of epidemic influenza, *la grippe*, or of cerebro-spinal meningitis, popularly known as "spotted fever."

LARGE BLISTER OF THE SKIN, OR PEMPHIGUS.

Pemphigus is an affection of the skin which has no popular name. It is characterized by large blisters, which may also be numerous. An individual blister may attain the size of a hen's egg. In mild cases the general health may not be much affected; in severe ones debility and headache are present, and there are forms of the disease so severe that they have a fatal termination. Depressed condition or disease of the nervous system, or of special nerves, may give rise to the eruption. Many cases are recorded in which an outbreak was secondary to some affection of the brain or spinal cord. Excesses, anxiety, overwork, mental strain may bring about the disease. An eruption of the same character sometimes follows or alternates with severe hysterical attacks. *Pemphigus* occasionally manifests hereditary connection.

REDNESS OF THE SKIN.

A diffuse redness of the skin, either uniform or interspersed with red pimples of various sizes, may be caused by disturbance of the nervous system. The complicated form of its display is generally symmetrical. Redness may occur as the result of perverted action of the nerves which control the blood-vessels of the skin. It may be due to lowered nutrition of the skin caused by impairment of its nervous power. It may eventually produce thickening and other alterations of the skin. It is often symptomatic of disease of the stomach, bowel, or of the spinal cord.

GLOSSY SKIN.

In some cases of obstinate neuralgia, injury to nerve-trunks, and disease of the spinal cord, the skin assumes an appearance

to which the name of "glossy skin" has been aptly applied by Dr. S. Weir Mitchell, of Philadelphia. It is smooth, shiny, pinkish or reddish, and is the seat of more or less burning pain. The condition occurs most frequently upon the extremities of the body. Hair and nails on the affected surface are lost, and the skin is liable to become rough or cracked.

DIFFUSE INFLAMMATION OF THE SKIN WITH BLISTERS.

A peculiar, not very common, disease has been observed of late years, characterized by large and small blisters and white pimples seated upon an area of redness. The affection often becomes chronic and exhibits marked tendency to relapse. The eruption is attended by intense itching, and the resultant scratching often results in raw spots and crusts. It is most frequently found upon the upper or lower limbs, and particularly tends to develop in the bend of the elbow and of the knee. It causes pain as well as itching. It depends upon a disturbed condition of the nervous system. It is often preceded by depression of spirits, grief, or anxiety. Professor Duhring tells of a case where it supervened in a healthy, strong man who, while gunning, got bogged, sank to his armpits in the mud, thought he was lost, and managed to extricate himself at last, exhausted, by getting hold of a tussock of grass.

DRY TETTER OR PSORIASIS.

Psoriasis is an obstinate disease of the skin which forms dry, whitish scales. The scales are very abundant, and in cases of long standing are shed in great numbers. The eruption may attack any part of the body, but it displays some preference for the knees and elbows. It excites more or less itching, especially at the beginning of or upon the development of new spots. It generally attacks during adolescence. Not infrequently it is hereditary. Its course has been known in certain cases to have been emotional. A number of cases have been produced by fright.

HÆMORRHAGE INTO THE SKIN, OR PURPURA.

In certain conditions of the nervous system and of the blood, haemorrhage occurs in the substance of the skin, as it sometimes does from mucous membranes, as from the nose, mouth, and other parts. Like the preceding maladies mentioned, it may suddenly supervene after an emotional shock, and a tendency to the disease may be inherited.

DROPSY OF THE SKIN.

This affection is characterized by the sudden appearance of isolated swellings beneath some part of the skin or of the mucous membrane. The skin itself covering these swellings becomes rose-colored or bright red. The swellings may vary from the width of a silver dollar to that of the palm of the hand. Sometimes they give rise to the sensation of tension, but they do not itch or pain. They develop rapidly, continue for a variable time, and when they go, disappear as quickly as they came. This abrupt advent and departure are indicative of causative nervous influence.

A special form of cutaneous dropsy is that to which the late Professor Charcot gave the name "blue dropsy of hysterical subjects." As indicated by its name, this kind of dropsy of the skin evidences hysterical condition as causative. The skin in these cases is harder than is usual in the others, and the surface pits but little, if at all, upon pressure with the tip of the finger. The skin generally exhibits a violet tinge, though the color is sometimes decidedly red. In some cases, however, the skin retains its usual color. The temperature of the surface is, as a general rule, reduced, and the sufferer experiences the sensation of numbness or of actual pain. The disease is one which does not readily disappear, although it shows abrupt modifications under emotional influence.

HARDENING OF THE SKIN.

A disease, happily rare, exists, in which areas or spots on the skin become hard, stiff, and cold. The affected surface is, in most cases, of a pale white or of a waxen hue, but is sometimes of a brownish-red color. If the extremities are involved, the limb attacked appears shortened, with distorted joints. When the face is the seat of the disease, the features are drawn out of place, are immovable and expressionless. The skin, at first swollen, has become attached to the deeper structures, even to bones when these do not happen to be covered with thick layers of muscles. In later stages of the disease, ulceration may occur. It is a very stubborn disease and may prove fatal. It may occur at any period of life, although it is most frequent in middle-age. It is more common in the female than in the male sex. This strange malady is intimately connected with the condition of the nervous system, as shown by its following severe and prolonged mental strain, violent emotion, mental shock; and it may be associated with disease in some other part of the nervous system.

FISH-SKIN DISEASE.

This is an affection characterized by the formation on the skin of scales which may overlap one another like those of a fish. The scales may vary in color from white to a dingy gray, to brownish, or even to black. It generally attacks the extremities, although the face may be involved, sometimes only the lips. Cases vary extremely in severity. In some cases only a small area is involved, and the scales are not very large. In others, a great part of the body is covered with huge, dirty scales. Persons suffering from the disease have been exhibited in museums as "alligator boys." The skin is always dry, wrinkled, and sensitive to atmospheric changes. In winter it is liable to crack. It generally occurs in early life, is sometimes present at birth, and has a tendency to run in families. It may occur in connection with derangement of the nervous system.

WHITE SPOTS.

Colorless patches sometimes appear upon the skin in consequence of violent emotion or of mental shock. They may be associated with nervous disorders, as neuralgia, epilepsy, and insanity.

GANGRENE.

The death of certain areas of the skin sometimes happens upon total cessation of capillary circulation; its failure being occasioned by disease involving the nerve-fibers which preside over the action of the capillary blood-vessels. There is a nervous malady which produces symmetrical gangrene of outlying parts; as, for instance, that of the fingers and hands, the toes and the feet.

SCROFULA.

Scrofula is a constitutional disease. It can, therefore, be combated only by means of hygienic and medicinal treatment which promotes general nutrition of the body. Inflammation and breaking down of lymphatic glands and extensive ulceration of the skin are only some of the concomitants of the disease. Tetter, pimples, redness of the skin in scrofulous children are less amenable to treatment than when children are free from underlying taint of scrofula. Sore eyes and diseases of bones and joints are frequent manifestations of scrofula.

There are several remedies which are very efficacious in scrofula. One of these is codliver-oil, given to adults in a dose of one or two teaspoonfuls, and to children in amounts suitable to their ages. With infants and young children it can be administered by rubbing it into the skin of the armpits, the breast, and other parts of the body where the skin is thin. It contains sulphur, iodine, bromine, phosphorus, fat, and other substances. The absorption of this oil into the tissues is easily effected on account of the character of its composition. However taken, it is a food as well as a medicine. Many children learn to like

its taste. A few years ago a gentleman was met who, for twelve years, had taken codliver-oil to suppress broken-down glands of the neck and ulcers of the skin. The taste of it was not at all obnoxious to him, and he had gained in flesh, weight, and appearance. The taking of the oil, however, was only part of his treatment.

The scrofulous are exceedingly predisposed to catarrhal attacks of the mucous membrane lining the nasal and bronchial passages, and the use of codliver-oil has a tendency to prevent these attacks. If a patient should revolt at the taste of the oil, it can be made into what is called an emulsion for his particular use. A palatable emulsion can be made as follows:—

Codliver-oil	4 ounces.
Oil of wintergreen.....	20 drops.
Syrup of wild-cherry	4 ounces.
Extract of malt.....	4 ounces.

Another great remedy is syrup of the iodide of iron. That is because iodine is of great efficacy in scrofula, and iron in combination with it increases its value. The dose for an adult is from ten drops to a teaspoonful. For a child of ten years of age, from a third to a half of that quantity can be given.

Chlorate of potassium is an excellent medicine in case of scrofula. If it be prescribed before the glands have broken down, it causes their swelling to diminish and redness of the skin to vanish. It promotes the general nutrition of the body, improves the quality of the blood, and checks the formation of matter. If matter has already formed, it limits its production, and its thin, unhealthy character disappears. It is best to begin with a dose of from a half to one grain, given in water before every meal, increasing the quantity gradually until the patient shows improvement.

Scrofulous patients need fresh air, sunlight, exercise, and nutritious food.

External treatment in scrofula should be undertaken at an early stage of the disease, in order to check inflammation, and

to prevent or to limit suppuration, the consequence of which would be a disfiguring scar. Gentle compression of the swollen glands will often cause them to subside. This may be effected by painting the surface every day with flexible collodion put on with a camel's-hair brush. The efficacy of this treatment is increased by saturating the collodion with iodoform. Another excellent preparation is a solution of iodoform in oleic acid, to be painted over the affected parts two or three times a day.

When matter has formed within the gland, the case demands surgical interference. The matter should be evacuated at the earliest possible moment. When the glands are completely degenerated, and the overlying skin is of a dull, unhealthy color, the surgeon not only liberates the matter, but treats the infiltrated part by special means, without which its circulation and health cannot be restored. By the means which the surgeon adopts the scar is much less extensive and disfiguring than when the aid of surgery is avoided. Moreover, healing is much more rapid by recourse to surgery than by relying upon medicinal action alone. Medication is called in at the same time with surgery, to play the secondary part in importance in such a case as that referred to.

LIVER-SPOTS; YELLOW SPOTS; BLOTCHES.

A certain blemish, which is sometimes the result of anæmia, may be either on the face or on the body. It may be produced by a number of causes. The affection is called by medical men *chloasma*, and is popularly known as "liver-spot." Patches of *chloasma* are round or irregular in form, vary in color from light or dark yellow to brown or even black, and are smooth to the touch. The patches are more conspicuous in persons whose complexion is dark than they are in others. Occasionally they extend across the forehead from one temple to the other. The skin may seem to be unaffected save for its change of color, but sometimes it is covered with a greasy secretion. Liver-spots, when once formed, spread very slowly, or else do

not increase at all in size. The affection is more common in women than in men. Besides being sometimes produced by anaemia, it may be caused by derangement of internal organs. It may also be caused by local irritation, as by the pressure of a hat, by heat or cold, or by other diseases of the skin.

As liver-spots generally originate from some disordered condition of organs of the body, it is best to call in the advice of a physician for their treatment. The following lotions may be used upon the spots and prove of assistance to the internal treatment by a physician:—

Corrosive sublimate	10 grains.
Alcohol	1 ounce.
Distilled witch-hazel	3 ounces.
Mix.	
Boric acid	2 drachms.
Distilled witch-hazel	2 ounces.
Cologne	2 ounces.
Mix.	

Observe that the first lotion has in it corrosive sublimate. Corrosive sublimate is a powerful poison. It should always be kept where it is inaccessible to children. All poisons should be marked "Poison, for external use only."

YELLOW BLOTCHES, OR TINEA VERSICOLOR.

An affection of the skin which bears some resemblance to *cholasma* is medically known as *tinea versicolor*, or *pityriasis versicolor*. It is a parasitic disease, caused by the growth upon the horny layer of the skin of a fungous micro-organism. There is one marked difference in respect to the regions of the body which these two diseases respectively attack. Liver-spots frequently, if not generally, occur upon the face, but *tinea versicolor* begins in the form of small, roundish or oval spots of a reddish or yellow color upon the body. They may become darker, but they do not generally deepen in shade beyond fawn-color. They may be few in number or very abundant, and neighboring patches are covered with fine, mealy scales and generally itch.

Although scarcely ever appearing upon the face, *tinea versicolor* is common upon the chest, back, arms, and shoulders.

It is advantageous to rub the patches, night and morning, with a fleshbrush. Small patches may be made to disappear by painting them with the tincture of iodine. It is well to begin by touching them, night and morning, with a solution of three drachms of powdered borax to five ounces of distilled witch-hazel. After this has been used for a few days, and the scales thereby removed, the most effective application is an ointment containing from forty to eighty grains of oleate of copper to an ounce of lard. The patches should be cleansed with the lotion mentioned, and not with water, for the reason that water favors the growth of the parasite.

OILY SKIN; SCURF; DANDRUFF.

A very common disease of the skin, and one that sadly mars comeliness, is called seborrhœa, and it is, unfortunately, more common among women than among men. The sebaceous glands are so affected in this disease that instead of furnishing only enough oily matter to lubricate it, they discharge an immense amount, which is, at the same time, altered in quality. The oily matter, superfluous in quantity and poor in quality, makes an unsightly deposit upon the surface of the skin. The disease is especially prone to occur upon parts of the body exposed to observation: the face, scalp, chest, and back. It may be so slight as not to occasion much annoyance, and may disappear with the cause. It tends, however, to be chronic, and may last for months or years. The products of the affection differ, are sometimes an oily fluid, sometimes consist of dry or greasy scales, the latter the commonest form. The forehead, cheeks, and nose are the favorite points for attack. The scales are of a yellowish, greenish, brownish, or blackish color, closely adherent to the skin. Itching and burning sensations are often present. In the oily variety the skin has a greasy appearance and may be either pale or red in color.

Seborrhœa is most common between the ages of fifteen and thirty. It is caused by an impoverished condition of the blood, and by any disease of the skin or of the internal organs which affects the general health. Exposure to heat or cold may give rise to it. As the disease is evidence of lowered vitality, it is of importance to look to the general health. Fresh air, sunlight, and exercise are indispensable. The medicines taken should be such as improve appetite, digestion, and secretion. In the oily form of the disease, the use of a dry and slightly astringent powder is useful, because it absorbs the superabundant discharge, and at the same time improves the tone of the skin. From time to time, too, the skin may be sponged with a mildly stimulative lotion. A good wash consists of:—

Boric acid	2 drachms.
Orange flower-water	2 ounces.
Rose-water	2 ounces.

Mix.

An absorbent powder which will prove useful contains:—

Oleate of zinc	2 drachms.
Powdered arrow-root	½ ounce.

Mix.

Another good powder is thus composed:—

Salicylic acid	2 drachms.
Subnitrate of bismuth	1 ounce.
Powdered oleate of zinc.....	3 drachms.

Mix.

When the disease is of the dry variety, the first object should be to get rid of the scales which prevent the lotions from coming in contact with the affected surface. The best method for this is by the application of olive- or almond-oil, or best of all, by the application of the oil of ergot, which is astringent and slightly stimulant. In some cases no further treatment will be needed than cleansing with soap and water. A soap which contains chamomile and sulphur is very beneficial. Boroglyceride is also of service. If the skin is much inflamed, the oxide of zinc may be used with good effect. The following is a good ointment:—

Salicylic acid	30 grains.
Borax	15 grains.
Peruvian balsam	25 minimis.
Oil of bergamot	20 minimis.
Oil of anise.....	6 minimis.
Cold cream	1 ounce.

When, as is often the case, dry *seborrhœa* attacks the scalp, it will, unless checked by treatment, lead to baldness. It is, in fact, one of the most frequent causes of premature loss of hair. The treatment is virtually the same as that for seborrhœa on the face. It is convenient to annoint the scales upon retiring to rest, using an oil-skin cap. From twelve to twenty-four hours are generally sufficient to detach the scales. If, upon the exposure of the underlying surface, its hue is of unusual paleness, more or less stimulating treatment is needed, whereas, if it shows the red of inflammation, bland lotions only should be applied to it. It is prudent to begin with mild remedies. A solution of table-salt, of the strength of one-fourth to three-fourths of a pound to the pint of water, is cheap, convenient, and will often prove effective. The carbonate of potash, five to fifteen grains to the ounce of water, may give good results. Sometimes equal parts of glycerine and water are beneficial. In those cases where decided stimulation is demanded, alcohol, and preparations into which it enters, as the various spirits, ether, the essential oils, etc., are frequently of advantage.

The nutrition of the scalp is promoted by massage, hot alternating with cold douches of water, by shampooing with either hard or soft soap, and above all, by the use of electricity from the galvanic current.

The persistence, and especially the increase, of dandruff should always excite attention. Treatment for threatening baldness should begin early, be carried on persistently, and in many, perhaps in most cases, it will be rewarded by success. Baldness, as a result of *seborrhœa*, is noticed here, on account of its close connection with *seborrhœa on the face*.

RED AND WHITE PIMPLES.

A disease which is of very frequent occurrence among young people is *acne*. It attacks not only the face, but the neck, bosom, and back. It consists of an eruption of pimples of various sizes. They may be as small as a pinhead or as large as a bean. They appear particularly upon the forehead, cheeks, and chin. Sometimes they are few in number and stand well apart; but, at other times, they are closely clustered. They may be hard and of a dark red color, or they may be full of matter, in which case they are white. Different stages of the eruption can generally be found upon the face at the same time. After middle-age, the disease usually disappears. In the case of large, broken-down pimples, filled with matter, indelible scars may be produced by them.

Many disordered conditions of the system produce *acne*: chronic dyspepsia, rapid physiological changes that take place in youth, trouble of mind, local irritation from uncleanliness, the use of powders, paints, and various cosmetics. In some persons the use of certain articles of food is sufficient to cause a fresh outbreak. The affection occurs more frequently in blondes than in brunettes. It attacks both sexes and persons in every station in life. Being of constitutional origin, it requires all the skill of the physician to trace it to its remote cause. It would not be justifiable to give minute directions in a work of this class for treatment which, on account of the disease being constitutional, needs a physician to prescribe for the individual case.

BLACKHEADS.

Blackheads are a very common blemish on the face. They mostly occur upon the chin and nose, and vary exceedingly in number. The medical name of the affection is *comedo*, and the blackheads themselves are called *comedones*. They are caused by a diseased condition of the sebaceous glands. The little channels by which the oily sebum of the skin reaches the sur-

face becomes plugged up with that substance, and the comedones end on a level with the surface, becoming blackened by dirt. Sometimes blackheads are in such great clusters as to form distinct bands upon the forehead or distinctly blacken the sides and tip of the nose.

Although blackheads themselves are, relatively speaking, a trivial affection, and denote nothing more than a local disorder of the skin, yet the distended condition of the oil-ducts proves enfeebled health. A physician often finds that the skin affection depends upon disorder of some internal organ. If the blackheads are associated with some derangement of the general health, that condition must necessarily be corrected. The points should not be roughly treated by squeezing or other exacerbation. Washing twice daily with soap and water, followed by friction with a rough towel, is beneficial. The soap should be bland, either plain or medicated with chamomile, salicylic acid, or some other detergent substances. An ointment containing the same ingredients may be used with advantage.

The following preparations are useful:—

Thymol	10 grains.
Boric acid	2 drachms.
Distilled water of witch-hazel.....	4 ounces.
Rose-water	1 ounce.
Mix. Sponge over the surface once or twice a day.	
Salicylic acid	30 grains.
Balsam of Peru.....	2 drachms.
Lard	6 drachms.
Mix. Spread upon the affected part every night.	
Carbonate of ammonia.....	1 drachm.
Simple cerate	1 ounce.
Mix. Apply at bedtime.	

RED NOSE AND CHEEKS.

This is another affection of the face. It is much more common in men than in women. It is most frequently produced by too great indulgence in eating. The disease is, in medical language, known as *rosacea*. Its usual site is on the nose, but it may attack other parts of the face. It has great tendency to

become chronic, and, if it completes its full course, is divided into three stages. Even in its mildest form it constitutes a serious blemish, while in its last stages, happily rare, it becomes a repulsive deformity.

In the beginning the affected part—the tip of the nose, for example—is simply red. The redness disappears under pressure, but returns at once when the pressure is removed. This redness is caused by the engorgement of the blood-vessels of the part. In this condition the sebaceous glands are generally stimulated to excessive activity, and the consequence is that the nose, in addition to being red, has an oily appearance. If the second stage be reached, the blood-vessels become so gorged that they stand out as red lines. The engorgement is so great that the blood-vessels assume a twisted look. In the third and last stage, which, as previously remarked is rare, the whole nose is dense, enlarged, and knobby. This is the condition described by Shakespeare when he makes Fluellen say of Bardolph, "His face is all bubuckles and welks and knobs and flames of fire, and his lip ploughs at his nose, and it is like a coal of fire, sometimes blue and sometimes red."

Rosacea may be produced by anaemia, chronic disorders of the stomach or liver, by a rheumatic or gouty constitution, or by the use of cosmetics, paints, and irritating lotions. In some cases it follows *acne*.

Constitutional treatment should be undertaken under a physician's care. Rich food should be avoided. For outward application the ointment of the oleate of bismuth applied thrice daily is good. When the nose is oily, a dusting powder is preferable to the ointment. It may be the powdered oleate of zinc, or the subnitrate of bismuth, or equal parts of each. Powdered starch with arrowroot, dusted over the ointment, will disguise its greasiness and assist its action. The following ointment is a good one:—

Carbonate of zinc.....	1 drachm.
Powdered arrow-root	1 drachm.
Ammoniated mercury	10 grains.
Simple ointment	1 ounce.

Mix.

Or a soothing lotion may be employed, of:—

Acetate of lead	10 grains.
Acetate of zinc	10 grains.
Rose-water	4 ounces.

Mix.

Other combinations which are of service in this affection are:—

Hydrochlorate of hydrastine	1 grain.
Distilled witch-hazel water.....	6 drachms.
Rose-water	2 ounces.

Mix.

Tannic acid	10 grains.
Sublimed sulphur	½ drachm.
Carbonate of zinc	1 drachm.
Lard	1 ounce.

Mix.

For the second stage of the disease, the extract and the tincture of witch-hazel externally in the form of a lotion or an ointment are efficacious for reducing the caliber and the twisted condition of the engorged blood-vessels. A method which is often of service consists in brushing collodion along the course of the enlarged blood-vessels. The vapor-bath is valuable for both the first and second stages of the disease.

The electricity of the galvanic battery is very useful in *rosacea*.

TETTER; SALT-RHEUM; MILK-CRUST.

The most common disease of the skin is *eczema*, which, in popular language, is often called "tetter," "moist tetter," or "salt-rheum." *Eczema* is rather more prevalent in the male than in the female sex, but it may attack either at any age. It not infrequently appears upon the face and neck. This disease includes about one-third of the sufferers from all diseases of the skin. It is not always easy to identify, because it assumes great diver-

sity of forms. Even the same case of it may present various phases. In some cases it begins with a simple redness of the surface, which subsequently becomes moist, and finally dry and thickened. In other cases it manifests itself in the form of little pimples, pustules, or water-blisters, seated upon a reddened surface and accompanied by heat, swelling, smarting, burning, or itching. Often the blisters become ruptured and their contents, escaping, dry upon the surface and form crusts. Itching is a very constant symptom, varying in intensity from slight annoyance to intolerable distress.

Eczema may be either acute or chronic. In the former condition its action is violent and rapid. The heat and swelling are conspicuous, and there is usually a good deal of discharge from the rupture of the water-blisters—"weeping," it is very graphically called. In some cases the scarf-skin is destroyed and the raw and red true skin is exposed. Such an attack usually subsides within a week, but it leaves a tendency to succeeding outbreaks. It may pass almost imperceptibly into the chronic form of the disorder.

The manifestations of chronic eczema are like those of the acute kind, but less severe. In addition, the skin gradually becomes thickened and often cracked. The itching is generally great. *Eczema* of the face exhibits the characteristics of the disease as just described. It may, besides, excite inflammation of the mucous membrane covering the eyeball and cause the eye to be bloodshot. The general surface becomes disfigured and the ravages of the disease may be aggravated by scratching. The disease is subject to a relapse from the slightest cause. If the eruption confines itself to the nose, it may, in time, excite *rosacea*.

Persons of light complexion and hair are more liable to have *eczema* than those of a temperament indicated by opposite attributes. It is usually an hereditary affection, depending upon some constitutional cause. Gouty and rheumatic subjects are more liable than others to its attacks. It may be caused

by disease of the lungs, heart, blood-vessels, liver, kidneys, and by *diabetes mellitus*. Dyspepsia is a common cause of the disease. It may also be brought about by derangement of the nervous system. Sometimes it alternates with attacks of asthma or bronchitis. Among local causes may be mentioned atmospheric changes, contact of chemical irritants, as in poisonously-dyed drygoods, etc.

The treatment of *eczema* must be addressed both to the system and to the part affected. It is essential that the exciting cause of the disease be removed, and therefore careful medical investigation is indispensable. According to circumstances, alterative and tonic medicines are demanded. Rheumatic or gouty conditions may be the underlying fact of the eruption. Diet and thorough hygienic practice must be observed. Plethoric persons and dyspeptic ones need different diet; the former a restrained one; the latter the fullest. Certain foods and drinks, however, should be avoided by all patients. Among these may be mentioned strong coffee or tea, alcoholic fluids, pork, cheese, and shell-fish. Rest, sleep, bathing, suitable clothing, good air, ventilation, sunshine, regular exercise, will be of the greatest assistance in the treatment of the disease.

Appropriate local applications are of material assistance. The remedies, however, which are suitable at one stage of the disease may be injurious at another. Acute *eczema* is usually best treated by bland applications, while the chronic variety generally requires stimulation. If crusts are present, they may be removed by saturating the surface with an oily preparation. It is prudent to begin with a mild remedy or remedies upon a restricted surface, and if the application proves beneficial it can be extended over a larger one, and, if desirable, gradually made stronger. Starch-water or an infusion of chamomile often serves well in acute *eczema*. Equal parts of lime-water, glycerine, and water make a good dressing. A solution of a drachm or two of borax or of bicarbonate of soda, in a pint of water, makes a lotion from which good results may be expected. A valuable prescription is composed as follows:—

Oxide of zinc	4 drachms.
Spirit of camphor	1 drachm.
Glycerine	1 ounce.
Rose-water	2 ounces.
Lime-water	3 ounces.

Mix.

When the surface is very red, moist and weeping, dry powders are often more effective than are liquid applications. Among those which may be applied are starch, arrowroot, rice, buckwheat, lycopodium, carbonate of magnesia, oxide of zinc, carbonate of zinc, oleate of zinc, and subnitrate of bismuth. If there is much burning and itching, a little camphor, in addition, will be of service. The following combination is beneficial:—

Powdered arrow-root	1 ounce.
Powdered oleate of zinc.....	2 drachms.
Powdered camphor	$\frac{1}{2}$ drachm.

Mix.

Any of the powders mentioned may be freely dusted upon the inflamed skin. It is a good practice to apply first a soothing ointment, which makes the powder more adherent to the skin.

In some cases ointments are more advantageous than powders. They remove crusts as well as acting remedially upon the inflammation. Excellent bland ointments are composed of a drachm of oxide of zinc or of carbonate of zinc, oxide of bismuth, or of subnitrate of bismuth, to the ounce of lard or cold cream. Cucumber-ointment and cucumber-cream are also excellent soothing applications. Some good formulæ for ointments are:—

Carbonate of zinc	1 drachm.
Subnitrate of bismuth	1 drachm.
Oil of chamomile	10 minims.
Cold cream	1 ounce.

Mix.

Calomel	10 grains.
Powdered starch	1 drachm.
Powdered camphor	20 grains.
Powdered oxide of zinc	1 drachm.
Benzoated lard	1 ounce.

Mix.

Instead of ointments, oils may often be employed with admirable effect. Olive, linseed, sweet almond, and palm oil, either alone or in combination, can be recommended. Equal parts of olive-oil and lime-water are serviceable.

In most cases of chronic *eczema*, bathing affords much relief. Vapor-baths, either plain or medicated, soften the skin, relieve the itching, and are of great assistance to other remedies employed. So is also the judicious use of medicated soaps. Tar is one of the best applications for the chronic form of *eczema*. Instead of plain tar, the more elegant preparations, the oil of cade and oil of white birch are preferable. An ointment of average strength may be made, as follows:—

Oil of cade	1 drachm.
Oil of verbena	5 minims.
Benzoated lard	1 ounce.

Mix.

The oil of white birch is very acceptably used in the form of a lotion according to the following formula:—

Oil of white birch	$\frac{1}{2}$ ounce.
Oil of lavender	1 drachm.
Cologne	6 ounces.

Mix.

Itching may often be alleviated by the use of the compound tincture of benzoin, a solution of benzoic acid in cologne, or lotions containing camphor, etc.

TETTER IN THE INFANT.

Infants and very young children are very liable to attacks of tetter. It is the commonest disease of childhood. On account of the delicacy of the skin at this early age, tetter differs in children, in some respects, from the same disease among adults. Diminution in the quantity or alteration in the quality of the mother's milk may occasion tetter in an infant. Digestive disturbances in very young children may also occasion an attack of it. Heat and cold, insufficient clothing, woolen garments, or the dye in clothes may produce it. The services of a physician are indis-

pensable at the earliest moment for infants and very young children. No amount of medical knowledge possessed by the layman is sufficient to meet their rapid changes. Their lives may be snuffed out in a few hours, or again, as in Mother Goose, where the old woman goes out to get a coffin for her supposedly dead dog, you find them up and about and full of life. But inasmuch as they are so susceptible, the only way for the wise to do, when children are ill, is to get a physician, and get him quickly.

REDNESS OF THE SKIN.

Patches of a rosy-red color often make their appearance upon the skin, especially upon that of infants and very young children. They are very liable also to occur on the tender skin of young women of nervous temperament. The affection is *erythema*, which means red or rose-colored. The patches often appear very suddenly, and may be numerous and of any size and shape. They may stay but a few hours, although, in some cases, they remain for two or three days. Red patches are generally occasioned by deranged condition of the digestive system. Red patches of similar appearance may, however, be caused by external injury, and especially by the action of heat. These differ from the sort caused by internal conditions in being limited strictly to the place injured and in being more persistent than the others. These may be caused by the irritation from dyes and from various mineral and vegetable substances. That form of *erythema* which is symptomatic of disturbance of the stomach or of the bowels disappears as soon as the cause is removed, and requires no further treatment than the administration of a laxative medicine. The form which depends upon external injury is relieved by the application of a soothing wash or an ointment.

BURNS AND SCALDS.

Burns come from dry heat, scalds from moist heat. In a severe form of burn the skin is actually destroyed, and sometimes deeper parts. In an extreme case the destruction pene-

trates to the muscular layers and even to the bones. If life be not extinguished, the dead tissues are cast off by a process of inflammation which begins somewhere from the third to the fifth day after the injury and continues for about two weeks. Deep burns occasion severe shock to the nervous system and are followed by extreme prostration. They are very dangerous to children, to aged persons, and to the debilitated. A burn that involves a third of the surface of the body is always fatal.

In treatment the first object should be to relieve from the shock and pain. Laudanum, in a dose of from ten to twenty-five drops, for an adult, should be at once administered. When the pain is severe or agonizing, the dose must be increased, even to the extent of forty drops for an adult. If laudanum cannot be had at once, it is best to give a drink of hot ginger-tea or a hot whiskey or brandy punch. The aromatic spirits of ammonia may be given in such a case in the dose of one or two teaspoonfuls well diluted with water.

After quickly but gently removing the clothing of the sufferer, he should be placed upon the softest possible bed. Loose pieces of flesh are cut away and the burnt parts covered with olive oil and dusted with some bland powder such as the sub-nitrate of bismuth. Equal parts of linseed oil and lime-water make a very good dressing. After the oil has been applied to the burnt surface, it should be covered with a layer of soft cotton lint. When large blisters form upon the burnt surface, they should be opened with a sharp knife or pair of scissors and their contents allowed to escape. The covering of the blisters, which is the scarf-skin, must not be removed, but the blisters be merely punctured. After the blisters have collapsed, the surface should be cleansed with a very weak solution of table-salt and water. One of the best dressings is gauze impregnated with boric acid or with iodoform. Several layers of this gauze are placed over the burned parts and covered with oil-silk, the whole kept in place with a bandage. The dressing need not be changed for one or two weeks. Iodoform is particularly valuable for the

relief of pain. The only objection to iodoform is its odor. One of the substitutes for it is known as *europhen*, a light yellow powder having a slight but not unpleasant smell. Ulcers left as a consequence of burns can often be healed by dusting them over with a fine powder of Peruvian bark, called by the drug-gists red cinchona bark.

It is necessary to be on one's guard against blood-poisoning, excessive inflammation, ulceration, and the formation of vicious cicatrices. Adjacent surfaces must be kept apart, and extensive burns necessitate skin-grafting. Great deformity and maiming are sometimes consequent upon extensive burns. To avoid these results is the anxious endeavor of the surgeon. For this reason he carefully separates adjoining surfaces, as, for example, the arm or the leg is separated from the body by means of softly padded splints.

In surgical skin-grafting minute pieces of skin are removed from a healthy person and laid with their under surfaces downward upon an ulcer, narrow strips of pure rubber being placed over these grafts to retain them in place. Over the rubber are placed, successively, a compress wet with a weak solution of salt and water, a pad of absorbent cotton, and a bandage. An outer dressing of plaster of Paris is useful in the case of children, or in that where the raw surface is near a joint. The dressing requiring readjusting every day or two, the part is then washed with a weak and warm solution of salt and water. Grafts are deposited about half an inch from one another and from the borders of the ulcer. Each of them forms a center from which healing extends. This process accelerates healing, but it is one which can be successfully undertaken only by a competent surgeon.

CHILBLAINS.

Extreme cold as well as extreme heat is capable of producing inflammation of the skin and even of the tissues beneath the skin. As the skin is so richly supplied with blood, healthy per-

sons can bear exposure to cold for a certain period without ill effects, but when the temperature is very low and the exposure much prolonged, chilblains, sometimes called frostbite, may result. Persons whose blood is thin and who are consequently weak, are easily affected in this way by low temperature. Moreover, a part that has been once frostbitten remains unusually susceptible to cold. The parts generally attacked are the extremities of the body, where the circulation is most feeble, the hands, feet, tip of the nose, ears, and cheeks. In the first class of the affection, mere redness of skin is produced; in the second, blisters; and in the third, the skin, with more or less deeper tissue, is destroyed.

In a mild form of frostbite the skin is, in the beginning, pale and nearly without sensation. Coming into a warm atmosphere, the blood-vessels dilate and the surface becomes red or purplish. After prolonged and intense exposure blisters are formed which may be followed by ulceration. The most severe form follows long exposure to intense and moist cold. Drunkards, owing to the fact of their languid circulation, are peculiarly liable to be severely attacked. Large blood-blisters come upon the skin, and the underlying tissue mortifies. Sometimes no blisters appear, the affected surface is white or livid, cold, and sensibility is abolished, followed by more or less mortification.

It is a popular practice to rub the part vigorously with snow or cold water in order to restore the circulation. If, however, the part has been actually frozen, the application of warm water is to be recommended. Afterwards, if the circulation be languid, and the skin unbroken, stimulating applications may be made to the part. A mixture of equal parts of tincture of myrrh and the compound tincture of benzoin is a very good lotion. Half an ounce of spirit of chloroform, added to an ounce and a half of the compound tincture of benzoin, also makes a very good application. Painting the part with tincture of iodine is often useful, if it be used not too freely at one time or at too frequent intervals. Thin-blooded persons should be

given a preparation of iron, should be warmly clad, and should avoid sudden and prolonged exposure to cold. If a person be found almost perished from cold, hot applications should be made all over the body, or better still, he should be put in a hot bath, covered with hot blankets upon emerging, be given hot drinks, and be rubbed briskly. The following lotions may be recommended as useful for chilblains:—

Solution of subacetate of lead	1 ounce.
Laudanum	1 ounce.
Distilled witch-hazel	2 ounces.

Mix. This liquid is frequently sponged upon the surface.

Oil of camphor	20 drops.
Balsam of Peru	1 drachm.
Suet	1 ounce.

Mix. These ingredients are rubbed together to form an ointment which is continually used upon the affected part.

When ulceration has taken place the surface may be treated with an ointment composed as follows:—

Balsam of Péru	1 drachm.
Nitrate of mercury ointment	2 drachms.
Carbonate of zinc	1 drachm.
Cold cream	1 ounce.

If mortification takes place, the dead parts should be cut away by scissors or knife. Upon the living surface, exposed by this operation, a mildly stimulating ointment is spread. A good preparation is:—

Boric acid	2 ounces.
Oxide of zinc ointment.....	6 ounces.
Cold cream	6 ounces.

ULCERS.

Ulcers were once defined by a great medical authority as mortification in miniature. They are the result of destructive inflammation. The death of the tissue attacked may be due either to the severity of the inflammatory process or to depravity of the blood. Ulcers may originate from either mechanical or chemical irritation, or from various diseases. They develop rapidly in some instances, and are then called acute. In other

cases, their onset being slow, they are known as chronic ulcers. Chronic ulcers occur most frequently upon the leg, in consequence of the pressure of varicose veins. They may, however, appear upon any part of the body. They may be single, or a number of them may occur at the same time in different regions.

Rest is an essential in the treatment of ulcers. If the disease is acute the patient must remain in bed. Internal remedies must depend upon the cause of the outbreak and the condition of the patient. If fever be present, a purgative medicine should be given. The citrate of magnesia or Epsom salts is a very good medicine for the purpose. Sweet spirits of nitre, in teaspoonful doses, may be given every two hours, with the neutral mixture, the dose of which is a tablespoonful. The neutral mixture can be prepared at home by neutralizing fresh lemon-juice with bicarbonate of potassium. It reduces fever, moderates thirst, and allays nausea. If a specific disease is the cause of the ulcer, the internal remedies must, of course, be directed to the constitutional disorder. In such a case the ulcer is merely symptomatic and will heal upon the disappearance of the cause which gave it birth.

The affected part should not only be kept at rest, it must also, when possible, be kept in an elevated position, in order to avoid accumulation of blood there. It is useful to bathe the ulcer from time to time with hot water. When the ulcer's action is so slow that the patient goes about with difficulty, change of climate will often produce good results.

The distilled water of witch-hazel is a good application for an ulcerated surface. Most cases of chronic leg-ulcer are benefited by compression by means of a muslin, preferably a rubber bandage. In many cases nothing will do so much good as light incisions into the raw surface and the consequent bleeding, promoted by placing the leg in a pail of water as hot as it can be borne. The loss of blood relieves the engorgement of the capillary blood-vessels and assists the work of repair. Various medicaments are applied, either with or without compres-

sion, to chronic ulcers. Among the many useful applications are balsam of Peru, iodoform, aristol, a mixture of camphor and salicylic acid, benzoic acid, benzoate of bismuth, subiodide of bismuth. Some of these drugs in the form of a powder are dusted upon the ulcerated parts; others are made into solutions with water and alcohol, or, rubbed up with some fatty substance, form ointments. The following are serviceable formulæ:—

Powdered Peruvian bark 3 drachms.

Subnitrate of bismuth 3 drachms.

Mix. Use as a powder.

Subiodide of bismuth 1 drachm.

Powdered cinchona bark 1 ounce.

Mix. Use as a powder.

Tincture of witch-hazel $\frac{1}{2}$ ounce.

Hydrate of chloral 1 drachm.

Water $3\frac{1}{2}$ ounces.

Mix. Saturate a piece of old muslin or of lint in the solution and apply to the ulcer.

Iodoform 2 drachms.

Balsam of Peru 2 drachms.

Lanolin 1 ounce.

Mix. For old ulcers apply on absorbent cotton.

Carbonate of zinc 1 drachm.

Creasote 5 drops.

Powdered starch 1 drachm.

Carbonate of lead ointment 1 ounce.

Mix. An excellent soothing ointment for acute ulcers.

Powdered ergot 2 drachms.

Powdered chlorate of potassium $\frac{1}{2}$ drachm.

Lard 1 ounce.

For chronic ulcer.

BOILS.

A boil is an area of inflammation situated in the true skin and the loose cellular tissue beneath it, having a dead center, popularly known as "the core," and ending its activity with the formation of matter and suppuration. The ordinary boil is attended with throbbing and pain. In the case of what are called "blind boils," there is no formation of matter nor suppuration. Boils often come in crops, new ones making their appearance

as the old ones are going. Any part of the body may be attacked by them, although they exhibit preference for certain localities, which are the face, neck, breast, armpits, and the extremities of the body. They are indicative of some disorder of the system, sometimes of the digestion. They occur frequently in cases of diabetes, scrofula, consumption, gout, rheumatism, etc. When predisposition to them exists, a slight irritation of the skin may lead to an attack.

A change of air often proves useful in their treatment. A sufferer from them needs fresh air and plain, nutritious diet. If depressed physically, such tonic remedies as iron and codliver-oil are needed. Old people are benefited by the moderate use of malt or spirituous liquors. Young people are often improved by the occasional administration of a purgative. When the boils are appearing in successive crops it is useful to give the sufferer from five to ten grains of the chlorate of potassium, dissolved in water, three or four times a day. If he be pale, a preparation of iron is judiciously added. A tablespoonful or two of yeast before each meal is thought to be efficacious.

Compression of boils will often, in their formative stage, check their development. Covering the part with soap-plaster tends to expedite the boils coming to a head. Sometimes a touch of lunar caustic on the head of the boil will cause it to disappear. A wash composed of equal parts of tincture of iodine, tincture of arnica, and camphorated alcohol, will, in some instances, prevent the formation of new boils. Other means used for the same purpose are saturating the skin with a solution of salicylic acid and using a solution of two and a half drachms of chloral to ten drachms of glycerine and ten of water. Belladonna ointment, or a mixture of equal parts of belladonna and mercurial ointment will sometimes accomplish the object.

If efforts to prevent a boil from coming to a head are a failure, the tension and pain in it are relieved by covering the swelling with a solution of one part of laudanum to seven parts of leadwater, with diluted tincture of witch-hazel, or the tinc-

ture of arnica. If matter begins to form, a warm poultice is useful. As soon as it may be ascertained that the swelling contains abundance of matter, a free incision into it should be made.

CARBUNCLE.

The formation of a carbuncle is usually accompanied by a chill, fever, pain, weakness, loss of appetite, and sickness at the stomach. The skin eventually ruptures at numerous points, from which blood-stained matter escapes. When the central portion of the carbuncle dies, it must either be discharged piece-meal, or, involving the destruction of a large area of skin, come away entire. The discharge of the core leaves a large, ulcerated cavity, which fills up slowly and leaves a considerable scar. The back of the neck is a favorite location for carbuncles. The carbuncle is dangerous to old people, often causing death. It occurs more frequently in summer than in winter, and in men than in women.

In a carbuncular attack the system must be supported by good nursing, nutritious diet, and stimulants. As medicines for it, the tincture of iron and quinine are most valuable. About half a teaspoonful of iron may be given in a wineglassful of water every two or three hours, and about nine grains of quinine in three doses during the day. It is generally necessary to administer an opiate in order to mitigate the pain of the carbuncle. From twenty to thirty drops of laudanum may be given to an adult, and this dose repeated every third, fourth, or sixth hour, according to the effect observed. It is always necessary to closely watch the effect of laudanum. If it allays suffering without producing too much drowsiness, no danger need be apprehended. When great drowsiness is caused and the pupil of the eye becomes very small and does not enlarge when the eyelid is held down for a moment or two and then suddenly lifted, the dose of laudanum should not be renewed until decided pain recurs and the pupil has resumed its natural size.

In the early stage of the disease, cold compresses, or even ice, are beneficial. Camphor and phenol (carbolic acid), equal parts, is a useful external remedy. So is the diluted extract of witch-hazel. A paste much employed by Professor Leloir in the early stage of both boils and carbuncles is thus composed:—

Mercury	20 parts.
Turpentine	20 parts.
Lead plaster	50 parts.
Resin	10 parts.
Carbolic acid	7 parts.
Extract of belladonna.....	10 parts.

Mix.

Some of this paste is kept constantly applied for the purpose of limiting or checking the formation of matter.

As soon as matter forms, warm poultices are to be applied and the swelling may be freely incised by a surgeon. It is then washed out and dressed with a mixture of one part of carbolic acid to twenty parts of olive oil, with balsam of Peru or iodoform.

NETTLE-RASH OR HIVES.

Urticaria is the medical name of nettle-rash. Among external causes of the disease of nettle-rash may be cited contact with the plant called the nettle, with the star-fish, the jelly-fish, the bites of mosquitoes, or other insects, coarse flannel underwear, some kinds of dyed underwear.

The internal cause of nettle-rash is, in a majority of cases, an irritation of the digestive system. Certain edibles are particularly apt to cause an outbreak of it: shell-fish, sausage, mushrooms, oatmeal, rice, berries, and buttermilk. Some drugs also produce it. It may be merely symptomatic of some organic or constitutional disorder. The disease appears on the skin in the form of wheals or hives varying in size from that of a split pea to that of a pigeon's egg. The patient suffers from sensations of burning, stinging, tingling, and itching. A peculiarity of the disease is the abrupt manner in which it appears, disappears, or transfers itself from one to another portion of the body. As a

general rule, an attack lasts for only a few hours, but there are cases in which it becomes chronic and may remain for years. In weakly or unhealthy children the eruption is more like a pimple than a wheal. In some cases, blisters, as well as wheals, form, or the wheals become large blisters. Some are distinguished by the immense size of the wheals. A variety is complicated with another disease, and haemorrhages occur in the substance of the wheals. The eruption is sometimes intermittent, occurring at regular periods of every two or three days, and again on a certain day of every week. The disease may attack persons of any age, but it is most frequent in children.

It is good practice to empty the stomach and bowels. If an attack comes on soon after a meal, an emetic will often be followed by immediate relief. If some hours have passed the same result may be secured by a dose of castor-oil, Epsom salts, or Rochelle salts. For a day or two the diet should be very simple, consisting of bread and milk, with soup or broth. Alcoholic liquors should be avoided. If the stomach be irritable the bicarbonate of sodium in from one- to five-grain doses, dissolved in water and given every second hour, or the subnitrate of bismuth, of the same dose in mucilage of gum-arabic, or stirred into water, will often prove effectual in reducing the irritation. If there is a tendency to repeated attacks the following prescription is good:—

Sulphate of magnesia	½ ounce.
Sulphate of iron	12 grains.
Dilute sulphuric acid.....	1 drachm.
Water enough to make.....	3 ounces.

Mix. Of this solution two teaspoonfuls are given three times a day in plenty of water, taken through a glass tube or a straw, cleaning the teeth afterward.

Alkaline mineral waters are also of service. If the digestion is habitually disordered, it is advisable to administer after each meal a powder consisting of ten grains of pepsin with one grain of ipecacuanha. Obstinate cases are benefited by the administration of from half a drachm to a drachm of sulphurous acid freely diluted with water three times a day.

When nettle-rash is persistent the administration of ten drops of fluid extract of jaborandi, three times a day, will sometimes prove very effective. It allays the itching of the disease and keeps the skin slightly moist, which, in chronic cases, is apt to be dry and harsh. The clothing should be of the lightest and loosest kind. The skin may be sponged with a lotion or covered by an ointment. For sponging, cold water is sometimes all that is needed. Equal parts of vinegar and water may allay the itching, or one part of whiskey to two of water. A hot mustard foot-bath has been known to succeed. A drachm of bicarbonate of sodium or a drachm and a half of bicarbonate of potassium, dissolved in water, makes a good lotion, or a drachm of creosote to a pint of water. The following lotion is a good one:—

Carbolic acid (phenol)	$\frac{1}{2}$ drachm.
Alcohol	4 drachms.
Camphor water	6 ounces.

Mix.

Another good lotion is five grains of menthol dissolved in one ounce of water. Sweet spirits of nitre either plain or diluted with water is sometimes efficacious; also a mixture of one part of ether to two parts of lukewarm water. Thirty grains of chloral or ten drops of chloroform to an ounce of water, or a drachm of alcohol and four ounces of water make good lotions.

Sometimes relief may be obtained from oxide of zinc ointment applied to the skin. Carbolic acid, menthol, cocaine, and other substances may be made into useful ointments for local application.

PRICKLY HEAT.

In medicine, prickly heat is called *miliaria*. It is an affection from atmospheric heat, and one which especially attacks children and fat persons. It generally appears in the form of numerous small, bright-red pimples. In some cases, minute blisters, instead of pimples, appear.

Simple treatment is effective in this affection. The clothes worn should be light, meats and spices should be avoided, and lemonade be drunk with advantage. If the sufferer be debilitated, iron should be taken. Cold water, freely used, is the best external application, the skin being then dried with a soft cloth and covered with a bland dusting powder, such as the subnitrate of bismuth or the oxide of zinc. If itching is unusually severe, it may be relieved by sponging the parts with a lotion containing three drops of carbolic acid to an ounce of water. Peppermint-water or menthol, five grains to the ounce of water, are also useful. Creasote water, a drachm to the pint of water, makes a good application. Sometimes ointments are preferable to lotions.

IVY-POISONING.

Certain varieties of ivy and sumach excite in some persons an active inflammation of the skin. It is well to know that the poisonous ivy has only three leaves, whereas the five-leaved variety is harmless. The berries of the poisonous sumach are white, whereas the red-berry variety is harmless. Some persons are so susceptible to the poison of the ivy that they can receive it through the atmosphere.

The inflammation from ivy-poisoning is reduced by soothing and slightly astringent lotions. One of the best of these is made by adding from a half to one drachm of the fluid extract of *grindelia robusta* to four or six ounces of water. A strong decoction of chestnut-leaves is another useful application. Decoctions of white or of black oak-bark, alder-bark, or *geranium maculatum* are also serviceable. Keeping the parts covered with a solution of six drachms of hyposulphite of sodium to the quart of water affords relief. Lime-water, lead-water, and laudanum diluted with tincture of witch-hazel, a solution of boric acid or of borax, or a solution of bicarbonate of sodium combined with borax, ice, and ice-water, and distilled witch-hazel-water are likewise good preparations.

PARASITES.

There is a large class of diseases produced by parasites which frequent the body of man. Some of these lowly organisms are of animal and others of fungus origin. The animal parasites that dwell upon the skin and excite disease are the itch-mite and the louse.

ITCH.

Itch is a contagious affection, as the insect which causes it is transferable from one person to another. It is frequent in camps, ships, schools, tenement-houses, and other places where many persons are congregated. Owing to general attention to cleanliness in this country it is not prevalent here. It is prevalent in Germany, Austria, France, Norway, and Sweden. This itch, or *scabies*, as it is medically called, is recognizable by the presence on the skin of many hard and soft, red and white pimples, together with blisters. It attacks by preference certain regions of the body, being most common between the fingers, front and back of the fingers, upon the back of the hands, the backs of the arms, the armpits, the breast, the feet, and the toes. The mite is from one-sixtieth to one-seventieth of an inch in length.

Old cases of itch are attended with considerable discoloration of the skin. The burrows which the mites make appear as dotted, slightly raised lines, whitish or darkish in color, depending upon the occupation of the sufferer. The pimples and blisters occasioned by irritation from scratching for relief resembles those of moist tetter, but their occurrence only in the situations mentioned serves to distinguish them from those due to moist tetter.

The treatment of itch is directed to the destruction of the parasite and the alleviation of the irritation which it has caused. Sulphur is one of the most efficacious remedies, and is administered in the form of an ointment, from one-half to two or three drachms of it being mixed with an ounce of lard. One ounce of *storax* to two ounces of lard, or *storax* mixed with an

equal amount of olive oil, makes a good application. One part of carbolic acid (phenol) to fifteen parts of olive-oil is effective and the carbolic acid alleviates the itching as well as destroys the mite. Carbolized oil is serviceable in obstinate cases. The most generally beneficial application is naphthol. It, too, both kills the mite and soothes. For an adult an ointment may be made by mixing half a drachm of naphthol with an ounce of fresh lard or of lanolin. The ointment can be made weaker or stronger in proportion to the age of the sufferer or the sensitiveness of the skin. Precede the application of any remedy for itch by a hot bath, of a hundred degrees Fahrenheit, containing four ounces of sulphide of potassium to thirty gallons of water. Three baths of this kind are generally given. When the disease has been extirpated, the clothing should be boiled, in order to destroy any parasites adherent to it. Gloves had better be burned.

LOUSINESS.

Lice which infest the head are of a different species from those which attack the body and live in the clothing. The favorite location of those which infest the head is on the back of the head. Debilitated and badly-nourished persons suffer more than others from an attack of head-lice. Body-lice cause white pimples and wheals, and haemorrhagic spots, and in old severe cases, the skin is, at the places attacked, darkened as well as thickened with a discoloration which is sometimes almost black. There is a third variety, called crab-lice, which infests the generative organs and sometimes even the eyebrows, eyelashes, and armpits. Anyone may, in traveling, incur an attack from lice of the different kinds.

The most cleanly, easy, and effective way to remove head-lice is by naphthol or corrosive sublimate soap, for it removes not only the insects, but the crusts which they have caused. To get rid of body-lice the clothing that has been worn should be burned, or at least subjected to prolonged boiling, and the body

cleansed by a warm bath and the use of either naphthol or corrosive sublimate soap. That species of insects which frequents the parts of the body previously mentioned is destroyed by the same means.

RINGWORM.

Ringworm is the common name of a great class of skin-diseases. It is caused by a fungus parasite and can be communicated from person to person. As it may affect different parts of the body, its varieties are named in accordance with that fact. There is ringworm of the body, the scalp, the beard, and even of the nails.

RINGWORM OF THE BODY.

The disease, when on the body, begins with a small, round, slightly raised spot, slightly scaly on top. As spots enlarge they become round patches. The central portion then fades more or less, leaving a ring of redness surrounding a portion of healthy or comparatively healthy skin. In time; the redness of the center is liable to reappear and repeat the fading process. In this way several concentric rings are formed, and the edges of exterior rings may coalesce. In some cases, ringworms disappear spontaneously in the course of a few weeks; in others they continue for an indefinite period. Sometimes the disease disappears during summer and is renewed in winter. When chronic the patches are of irregular shape and size, of a dark red or brownish color, and are covered with small scales. Face, neck, back of the hands and arms, are the favorite sites of ringworm. When the nails are invaded by the parasite they become dry, thick, and brittle, and either crack or separate in layers.

For treatment of ringworm, sometimes a few applications of the tincture of iodine is all that is necessary. A drachm of sulphurous acid to an ounce of alcohol is sometimes used with good effect. An ointment of from twenty to thirty grains of carbolic acid to an ounce of lard; forty grains of salicylic acid, or

twenty grains of thymol to an ounce of lard may be used with benefit. Preparations of sulphur are good. The very best application, however, is an ointment of the oleate of copper. Pure oleate of copper has the power of destroying the ringworm parasite. Free use of water upon the surface must be avoided, for it promotes the growth of the parasite and consequently counteracts the effect of the curative application. A good formula where the oleate of copper is used is the following:—

Boric acid	30 grains.
Oleate of copper	24 grains.
Lanolin	½ ounce.

Mix. If it does not prove strong enough, the amount of oleate of copper can be increased.

BARBER'S ITCH.

Another form of ringworm is barber's itch. It necessarily affects only adult men and the bearded parts of the face. It may be conveyed by contagion, as, for instance, from ringworm upon another portion of the body, or from a child afflicted with ringworm of the scalp. The usual way in which, however, it is conveyed, is by contaminated instruments of the barber. It is most common between the twentieth and fortieth years of age. The eruption is of small, round, red, and scaly patches upon the lip, cheek, or chin. After a time, deeper portions of the skin become inflamed by the parasite, and larger pimples are formed, roughening the surface, at last suppurating and discharging their contents as thick yellow crusts. As the disease progresses the hairs lose their polish and become dry and brittle. Finally, loss of hair over a large surface may occur. In mild cases, however, the hairs are unaffected. The disease is of an essentially chronic tendency.

It is not advisable to clip the beard close, to shave, or to pluck out the hairs by the roots. The last two procedures add to the inflammation. An excellent application for barber's itch is the compound known as the fifty per cent. solution of *boron-glyceride*. The liquid is mopped on the surface night and morn-

ing, and rubbed in with the tips of the fingers. Oleate of copper, too, is as efficacious in the treatment of barber's itch as it is in the case of ringworm of the body. The formula for it has been already given in connection with the description of ringworm of the body. Another good application for barber's itch is thus composed:—

Boric acid	4 drachms.
Sulphuric ether	5 ounces.
Alcohol enough to make.....	20 ounces.
Mix.	

It is a good practice, in order to guard against communicating the disease to other persons, to rub into the beard a solution of thymol, of forty-eight grains to the ounce of olive-oil, or of the oil of sweet almonds.

RINGWORM OF THE SCALP.

This description of ringworm of the scalp would appear appropriately in a subsequent chapter devoted to diseases of the hair; but as we are considering the subject of ringworm, it will appear just as appropriately in this place. This kind of ringworm generally begins in the form of a round spot of a grayish or pale red tint, slightly raised and covered with fine scales. In the progress of the disease more or less temporary baldness is produced. There is, in this form of the disease, the same tendency to heal in the center of the eruption, and to form rings of the red and scaly character already discussed. In severe cases nearly all the hair of the head may be lost. In scrofulous children much matter may be produced upon the affected surface, which, drying, leaves the head covered with thick, yellow crusts.

Ringworm of the scalp is a contagious disease, and often spreads through families, children's asylums, and schools. It is essential, therefore, that the sufferer should be, as far as possible, isolated from companionship. Different rooms must be occupied by sufferers, different brushes, combs, etc., used by

them, different hats, clothing, etc. The heads of other children near them should be washed daily with a weak solution of borax and alcohol, and then anointed with a mixture of ten grains of thymol to one ounce of olive-oil. It is beneficial to sponge the eruption every day or two with the alcoholic solution of thymol or borax, and subsequently to add to it the fifty per cent. solution of *boroglyceride*. In its early stage this treatment alone will often cure the disease. In case, however, that it proves unsuccessful, we may then resort to the oleate of copper as already previously described. A small amount of it should, every night and morning, be rubbed into the diseased surface—no water being allowed to come into contact with it. After the subsidence of an epidemic of the disease, in asylum or school, the walls should be white-washed or painted, and the floors washed with a solution of corrosive sublimate. The brushes and combs of an asylum should be burned.

SYCOSIS.

Sycosis strongly resembles barber's itch in respect of the fact that it attacks the beard. But *sycosis* is not parasitic and is not contagious. It is associated with some failure of the health. It may follow the use of innutritious food or excesses of various kinds. It occurs sometimes during convalescence from severe attacks of disease, and among those persons who are mentally or physically overworked. It begins with pimples situated around the hair-follicles. These generally become filled with matter, and the hairs become loosened by the process of suppuration. The skin in the neighborhood of the pimples is hot and swollen. Considerable pain accompanies the eruption. Very often the matter within the white pimples is not discharged. When it is discharged it forms crusts. In the milder cases the pimples stand apart. If the inflammation becomes severe, they coalesce, and the part becomes extremely swollen and the formation and discharge of matter sufficient to cause permanent scars and loss of hair.

The appearance of *sycosis* is unlike that of barber's itch, from the fact that in *sycosis* the pimples are pierced in the center by healthy hairs. The hairs remain firmly fixed until loosened by suppuration. Then they are easily extracted and their roots are found to be swollen and covered with matter. This is not the case in barber's itch. In that the appearance of the hairs is entirely different, the dead, nibbled appearance of the hairs, amidst scurvy patches, being entirely different from that of *sycosis*.

As *sycosis* is associated with debility, the sufferer needs a nutritious and digestible diet and tonic medicines—quinine, cod-liver oil, maltine, compound syrup of the hypophosphites. The hair may be cut short, but should not be shaved or plucked out. When the disease is in the active stage, nothing but mild, soothing applications should be made to the skin. Crusts can be removed by saturating them with oil, or by the employment of a flaxseed or starch poultice. Lead-water or a weak solution of witch-hazel reduces the inflammation. Olive-oil, the oil of ergot, or codliver-oil serves the same purpose. Oxide of zinc ointment or a salve of subnitrate of bismuth is beneficial. In the chronic form of the disease, an ointment of sulphur, tar, naphthol, or carbolic acid may be used with advantage. Puncture of the pimples and swollen tissues is useful, but can be properly performed only by a surgeon.

GROUPS OF BLISTERS.

Persons with a delicate, sensitive skin are liable to be attacked by small blisters upon various parts of the body. They may be caused by a disordered condition of the mucous membrane of the respiratory or of the digestive tracts, and are characterized by being closely grouped together. They may also occur in consequence of cold and other atmospheric causes, and for this reason they are often called "cold-sores." They may sometimes accompany or follow some febrile disturbance, and are therefore known as "fever-blisters." Cold-sores, fever-blisters, or *herpes*, to use the medical name, are blisters rising from

a red surface and varying in size from that of a pin's head to that of a split pea. *Herpes* may occur upon almost any part of the body, even in the mouth. It generally lasts about a week.

A solution of camphor or of menthol is a good application in this affection. It may be made to disappear by moistening it with alcohol in which a little thymol or menthol has been dissolved; indeed, alcohol alone may suffice. The liquid should be kept in contact with the sores by means of compresses covered with absorbent cotton held in position by sticking plaster. Among the medicated plasters appropriate are those of belladonna and boric acid, oxide of zinc, camphor, and opium. The advantage of using plasters is that they remain in position. Whenever the position of the surface admits of it, starch powder, lycopodium, the subnitrate of bismuth, carbonate of lead, calomel, and finely powdered Peruvian bark make excellent dusting-powders.

SHINGLES.

There is another form of *herpes*; the eruption consisting of little blisters upon a reddened skin, but limited in its position by its following the course of some nerve. The line of eruption may extend around the body, for which reason one of the medical names of the disease is *zona*, a "girdle." The development of shingles is often accompanied by fever, and pain may be experienced days before the outbreak of the eruption. In three or four days the water of the blisters changes into matter, which in a week or two dries into crusts.

The duration of shingles varies from one week to several weeks. It most frequently attacks young persons, and occurs equally in both sexes. There are regions of the body which are peculiarly liable to its attacks. These are the face, the sides, and the breast. In these situations, the blisters follow the course of the large nerves, which lie not far below the surface. In rare cases of shingles of the face it attacks the eye and causes serious inflammation. Upon the body, shingles, as a

general rule, manifests itself only on one side of the body, generally the right. A popular belief exists that if the eruption extends along both sides of the body, and meets in the center, the case will terminate fatally. There is not the slightest ground for this ridiculous notion. When the disease invades the eye it may prove fatal. The characteristic pain of shingles is less in children than in adults.

To relieve the pain it is desirable to administer an anodyne. Laudanum may be given to an adult in doses of twenty-five, thirty, or forty drops in water, watching the effect, lest it produce too great somnolence, according to directions previously given. In case that laudanum is obnoxious to the patient, for it makes some persons sick at the stomach, resort may be had to bromide of potassium, in doses of from twenty to thirty grains dissolved in water, which, however, may fail of the desired effect. Only a physician can properly prescribe in a case like this. It is often necessary to give tonics to sufferers from shingles; for they are often weakly and need iron, quinine, maltine, compound syrup of hypophosphites, codliver-oil, etc.

For the eruption a good treatment is by first washing the affected surface with a solution of boric acid and then applying a paste compounded as follows:—

Boric acid	15 grains.
Oxide of zinc	30 grains.
Powdered starch	30 grains.
Lanolin	90 grains.
Rose-water ointment	150 grains.

Mix. After applying the paste, bind over it a thick layer of absorbent cotton.

Another compound which relieves pain is:—

Hydrochlorate of cocaine	10 grains.
Lime-water	3 ounces.
Distilled witch-hazel water	3 ounces.

Some of this mixture should be frequently mopped on the surface.

ERYSIPelas.

Erysipelas is an affection which is also known by the names of "the rose" and "St. Anthony's fire." It is characterized by fever, inflammation of the skin and sometimes of the mucous membranes. It generally begins with a chill and sickness of the stomach. Fever, headache, coated tongue, and other signs of constitutional disturbance soon follow. Twenty-four or thirty-six hours after the chill the eruption appears. The skin assumes a peculiar deep red color, is swollen and glossy, burns, tingles, and itches. *Erysipelas* commonly appears upon the face, but it may attack any region of the body. When developed on the face, the features are all swollen, the eyes closed, and the sufferer is hardly recognizable by his most intimate friends. The disease may attack the throat, and sometimes first develops there. The eruption reaches its height in three days. The fourth day its color begins to fade and the swelling to subside. The sufferer is convalescent the ninth or tenth day. *Erysipelas* causes serious depression of strength and sometimes occasions delirium; cases in which it appears being sometimes serious, but not necessarily fatal. Many complications are liable to occur in cases of *erysipelas*. Among them are pleurisy, pneumonia, and disease of the heart. Drunkards attacked by *erysipelas* generally die. There is a form of *erysipelas* which is almost certain to be fatal. In it the inflammation of the skin invades the underlying parts. Matter is profusely produced, much tissue destroyed, and the blood poisoned. The disease is most prevalent during spring and autumn, and most frequent between the twentieth and fiftieth years of age. It differs from other eruptive fevers in the peculiarity that it predisposes to other attacks of the same affection.

The parasite which causes the disease obtains entrance to the body through some break in the skin, however slight. The disease is feebly contagious. That the condition of the system has much to do with the ability of the *erysipelas*-germ to de-

velop is proved by the fact that physicians seldom contract the disease from patients. The most generally beneficial form of treatment is by the tincture of chloride of iron in the dose of one-half to one or even two teaspoonfuls in water every third hour. The iron always needs to be well diluted with water, and whenever practicable should be taken through a glass tube, so as to prevent its blacking and corroding the teeth. After each dose the teeth may be cleansed with a cloth dipped in a water-solution of borax, bicarbonate of sodium, or one of common salt. In addition to the iron, three grains of quinine, thrice a day, is advantageous. If serious prostration occur, these medicines must be supplemented by the administration of a stimulant, such as wine, whiskey, or brandy. Stimulants are imperatively demanded in these cases where matter is freely formed beneath the skin, occasioning large, diffuse, and destructive abscesses. If the sufferer has been in the habit of using malt or spirituous liquors, they should be systematically administered. When the fever is high, cold compresses upon the head, or better still, ice-bags applied to the head, face, or neck, quiet the brain. They also have a good effect upon the inflammation of the skin. In every case the bowels should be kept properly open.

One of the external preparations in most common use is the tincture of iodine repeatedly (three times a day) painted upon the affected surface, unless it begins to form blisters. A good combination is the following:—

Creasote	2 drops.
Carbonate of zinc	$\frac{1}{2}$ drachm.
Bismuth oleate	$\frac{1}{2}$ ounce.
Cold cream	$\frac{1}{2}$ ounce.

Mix.

A good domestic remedy is lard spread thickly upon the parts and covered with a layer of absorbent cotton held in place by a bandage.

Many antiseptic substances for use in *erysipelas* have been of late years used by physicians, and have undoubtedly resulted in lessening the duration and the severity of the disease, but their

intelligent employment is possible only under the advice and supervision of a physician. Equal parts of carbolic acid and glycerine, applied every second hour to the affected part, have proved of service. An ointment of corrosive sublimate of the strength of two or three grains to the ounce of lard is good. A mucilage of acacia, holding three to five per cent. of carbolic acid, is good. Salicylate of sodium dissolved in glycerine is highly recommended.

ABSENCE OF PIGMENT OF THE SKIN (ALBINISM).

The coloring of the skin may undergo changes in quantity and arrangement. It may increase, diminish, or be distributed irregularly. In certain extreme cases there is an entire absence of pigmentary matter and the skin is of a dead white color, the hair is white, and the eyes of a pinkish tint. This condition is known as "albinism," and the sufferers from it are known as "albinos." The disease may involve only a portion of the skin of the body or it may be general. Partial *albinism* is more common among the dark-complexioned races than among the white ones, and is sometimes hereditary.

White spots may be acquired at any age in either sex. This form of the disease generally attacks persons who, by original endowment, had an abundance of pigmentary matter in the skin—dark-complexioned whites and negroes. The spots may be of any size and adjacent small spots may coalesce to form a large one. Thus almost the whole body may gradually lose its color. The hairs on the spots are generally, not always, devoid of color. Upon the face the spots make great disfigurement, additionally because they are surrounded by abnormally dark borders.

This alteration in the natural distribution of the coloring matter of the skin probably depends upon disturbances of its nervous state. The condition has been known to follow an attack of influenza. An attack of epilepsy is recorded in which the onset was preceded by the appearance of white spots over the whole body. Unfortunately no internal or external treatment

has been discovered which will cause the coloring matter to be properly distributed. The best that can be done is to remove, so far as possible, the darkness of the borders around the spots, whose depth of color intensifies the appearance of whiteness in the spots themselves. Tincture of iodine, carbolic acid, and other medicaments are used for this purpose, but the most efficient agent is galvanic electricity.

MOTHER'S MARKS.

There are several conditions included under the name of "mother's marks." The two most common are the mole and the claret- or port-wine stain. The mole does not always date from birth, and therefore, strictly speaking, cannot necessarily be called a mother's mark. Nevertheless, the majority of large moles do exist from birth. In extreme cases they are so extensive as to cover a large part of the body. In color they range from yellow to brown and even to black, and may or may not have a growth of hair. It is wonderful that parents can sometimes allow children to grow up without having moles removed from their faces, for it is only in very rare instances that they disappear spontaneously. The spot may be removed by either of four processes; by the operation of a surgeon, by means of a ligature, by the galvanic needles, or by caustic. On the face they are a great disfigurement. With age they often become pendant and hang down like a great tear of skin. This kind can be removed in a few seconds by the operation of the galvanic needles. Their vitality thereby becomes sapped, and in a few days they drop off.

The port-wine or claret-stain is an affection more common in the male than in the female sex. Galvanic electricity is the only application that can ameliorate this form of marking of the skin. They may, when small, be removed by caustic or by surgical interference.

WARTS.

Warts may appear in crops, and are common upon the face and the hands. Occasionally they develop beneath the fingernail. If, as is not uncommon, warts appear in unhealthy or in scrofulous children, tonics must be given them. For internal administration, *thuja occidentalis* (*arbor vitæ*) is sometimes given in fluid extract or in tincture, ten drops to a teaspoonful of water, three times a day. This variously called *thuja occidentalis*, *arbor vitæ*, grows in the north of the United States. Tincture of iodine in ten-drop doses, well diluted with water or glycerine, taken twice a day, is a good medicine. Magnesia, in three- to fifteen-grain doses, twice a day, and also Epsom salts, have been known to cause warts to disappear.

Direct local treatment for warts is more satisfactory. They may be cut away and the base touched with lunar caustic. A thread tied firmly around the base of a wart will cause it to die and slough away. Galvanic needles will remove it. Touching it with nitric or carbolic acid will also remove it. Vinegar, boric acid, salicylic acid, tincture of iron, and other acid or caustic substances will remove it. Warts, or what seem to be warts, in elderly persons should be regarded with suspicion and should never be irritated with picking. A form of cancer often begins with a small growth which closely resembles a wart.

CORMS.

Corns are especially troublesome when occurring on the soles of the feet. There is a popular misapprehension about the constitution of corns which assumes that they have a root. On the contrary, they are simply an abnormal increase of the horny layer of the skin, brought about by its effort to protect the parts injured from pressure. The first aim in treating corns is to remove their exciting cause, whether represented by ill-fitting or by tight shoes. This alone is often followed by the spontaneous disappearance of the evil. If not, they should be treated with

perforated pieces of felt in which there is a hole in the center, through which the corn, protruding, is relieved from all pressure. The felt appliance may or may not be medicated. A good lotion is made by dissolving thirty grains of salicylic acid in half an ounce of collodion. It is applied with a camel's hair brush twice a day for several successive days. Soft corns, which come between the toes, can be removed by enclosing them in the same manner as that above described, in pieces of white kid, by dusting them with some bland powder, and by keeping a piece of raw cotton between the toes.

HORNS.

A very strange and fortunately uncommon affection of the scarf-skin is the growth of veritable horns from its surface. In some cases they have attained the length of a foot. They develop most frequently upon the head, and there have been cases presenting several of these excrescences. They occur more frequently in old than in young persons. They grow slowly, are painless, and generally break off after attaining a certain size. If the whole horn is then shed it may not again grow, but it generally forms again. Sometimes, when that is the case, the shedding takes place at an interval of every six or twelve months. They can be finally removed by electricity, caustics, or by surgical methods. The surgical treatment consists in taking them away with a part of the skin surrounding the base and then thoroughly cauterizing the surface left.

PIGMENTATION.

Darkening of the skin occurs from numerous causes, and is sometimes transient, sometimes permanent. Chronic inflammation of the skin, irritation, and certain constitutional conditions and diseases lead to the deposition in it of excess of pigment. Removal of the excess of color depends entirely upon ability to remove the condition that causes it, and upon the length of time during which it has persisted. Perfect cleanliness, mas-

sage, and galvanic electricity promote the health of the skin, and may cause gradual absorption of its excess of pigment. The advice and supervision of a surgeon would be necessary in using one of the methods by which the scarf-skin of the part can be removed.

NERVOUS AFFECTIONS OF THE SKIN.

The healthy condition of the nerves of the skin can be disturbed by many causes, some internal, others external. Sensibility in the skin may be heightened, lowered, perverted, or lost. Some diseases of the brain, spinal cord, or of the general nervous system are accompanied by so great an exaltation of sensibility of the skin that its contact with the clothing, or even with the air, becomes exquisitely painful. Some other diseases lead to a partial or to a total abolition of the skin's sensibility over certain regions of the body. Of course, in cases like these, no household treatment is practicable. A physician's attendance is our only resort.

NEURALGIA OF THE SKIN.

Neuralgia of the skin is manifested by the sensations of pricking, burning, or by shooting pain, which may be moderate, severe, transient, intermittent, or constant. Although the pain may be so acute as to be unbearable to a slight touch, hard pressure will often afford relief. The affection is more common in women than in men. It appears abruptly, sometimes vanishing in the same way. Instead of pain the sensation may be simply that of cold or of numbness.

The treatment should depend upon the ascertainment of the cause of the ailment. If the sufferer has indigestion, that should be treated. If the *neuralgia* is associated with any of the diseases previously mentioned, relief from the underlying disorder will be followed by disappearance of the *neuralgia*. If the cause cannot be detected, the *neuralgia* may be relieved by the administration of valerian or by Dover's powder. Dover's powder con-

tains one grain of opium in ten grains of the powder and it is upon this constituent that the efficacy of the powder chiefly depends. Antipyrin has been recommended for treatment of *neuralgia of the skin*, but it has the objectionable quality that it may cause sickness at the stomach, chill, or weakness of the heart. It has been largely taken by people upon their own prescription, but such a powerful drug taken by persons not medically educated is much to be deprecated. A hot water-bag or a vapor-bath is often beneficial. In some cases the application of cold water or an ice-bag is more efficacious. The pain may be alleviated by rubbing the painful part with solid menthol or by applying from twenty to thirty grains of menthol to from six to eight ounces of cologne. An ointment composed of from five to ten grains of cocaine to the ounce of lard is good. A blister on the affected surface is sometimes beneficial. In certain cases, galvanism succeeds after every other mode of treatment has been tried in vain.

SCARS.

Scars, of course, vary in size according to the extent of the injury which caused them. They may be on a level with, above, or below the surrounding skin. As the tendency of scars is to contract, they may cause intense pain by pressing upon some enclosed fiber of nerve. This is the explanation of the cause of pain in an amputated limb.

The surgical and the electrical are the only treatments to which scars are amenable. If a scar be on the face, it is a great disfigurement. If not too large it can, however, be entirely removed. When the edges of the wound have healed, there will be, it is true, another scar in place of the first, but it will be one in the form of a scarcely perceptible line.

Scars elevated above the surface of the skin, more urgently than those upon a level with it, demand surgical interference. In the first place, a raised scar is more unsightly than the other kind, and then it is more than the other liable to injury.

Injury to a scar awakens inflammation in it, and in the case of the aged, tendency to degenerate into cancer. If it be not practicable to remove a raised scar, it can sometimes be levelled by massage and by frequent galvanization.

ITCHING OF THE SKIN.

Excesses, debility, indigestion, rheumatism, gout, and many other diseases may produce itching of the skin, and it may also be produced by excitement. In the same kind of cases, creeping, tingling, and burning sensation, as well as itching, are experienced. In a recent extreme case, the patient, who was of a very nervous type, had blotches that looked like bruises, which proved a disordered condition of the blood. But the perversion of sensibility here described may be the only manifestations of disease of the skin.

If the special cause of the disease cannot be discovered by the physician, he endeavors to build up the general system by improving the tone of the digestive organs and correcting the impurity of the blood. In many instances the administration of codliver-oil accomplishes excellent results. When the ailment depends upon digestion, the diet should be simple; spirituous liquors, tea, coffee, tobacco, and indigestible foods should be avoided. A pleasant journey by easy stages is efficacious. The employment of massage and galvanic electricity is beneficial, also Turkish and vapor-baths, the hot and the cold douche. In some cases hot, in others cold water proves beneficial, and in others again, the alternation of hot and cold water.

The affected surfaces are bathed to advantage with a soap containing five per cent. of menthol. It is used night and morning, and in obstinate cases is allowed to dry upon the body. Anointing the skin after a bath with olive-oil or with glycerine will sometimes allay the itching. Cocaine-ointment is also a good application. Ointments containing camphor, creasote, carbolic acid, are of service. A dusting-powder will in some cases relieve the irritation. For this, ten parts of powdered subnitrate

of bismuth to ninety parts of starch powder may be employed. Medicated plasters produce good results in some cases. Lime-water, alone or mixed with glycerine, lead-water and laudanum, camphorated alcohol, weakened with water and mixed with borax and glycerine, and equal parts of rose-water and glycerine are preparations that may be employed. This disease is apt to be rebellious, and in consequence it may be necessary to try one remedy after another before the particular one adapted to the case is found.

BITES AND STINGS OF INSECTS.

Spots of inflammation, with considerable swelling and itching, may be caused by numerous kinds of insects. The effects of these are most severe upon infants, young children, and young women; in general, upon those having thin, delicate, and therefore sensitive skins. The most common insect pest in this country is the mosquito, capable of producing in some cases wheals like those of nettle-rash. The irritation produced by the sting of the mosquito may be relieved by sponging the surface of the skin with peppermint-water, ammonia-water, spirits of camphor, or a solution of borax and water. A drachm or two of boric acid, or ten to fifteen grains of betanaphthol, in four ounces of peppermint or camphor-water, constitutes a good lotion.

The bed-bug causes much irritation to the delicate skin of some persons. Any one is liable in traveling or in other exceptional circumstances, to be attacked by it. Half a drachm of powdered borax to four ounces of camphor-water; a drachm of boric acid to a pint of water; half a drachm of carbolic acid to a pint of water; the benzoated oxide of zinc ointment, either alone or combined with boric acid; all are preparations which may be used to advantage in alleviating irritation from bed-bug bites.

In case bed-bugs invade a house, as they sometimes do, harboring in wall-paper and in other places, the paper should

be removed and every place scoured for a few days with a solution of corrosive sublimate and water, a drachm or two to a pint of water. Corrosive sublimate being an active poison, it should be marked as such and placed out of the way of children.

Ticks sometimes lodge upon and insert themselves beneath the skin of wanderers in certain woods. Removed by violence, there is liability of inflammation from the proboscis of the animal being broken off in the skin and creating inflammation. The application of turpentine, benzine, or tobacco-juice causes the large ticks to release their hold. There is, however, a small variety of ticks, known as seed-ticks, which bury themselves in the skin in the most inaccessible place to be reached by the human hand—between the shoulder-blades. To meet this double difficulty growing out of their insertion in the skin and of the locality which is chosen by the insects, it is necessary to strip and let some person apply sweet-oil or some other oily liquid to the surface involved. This procedure, compelling the insects to retreat on account of their exclusion from air, affords perfect relief.

There are numerous other insects which bite and cause irritation and inflammation of the skin. The annoyance can be relieved by sponging with ammonia water. Either a lotion or an ointment containing borax is useful for the same purpose. A raw onion bruised and applied to the spot stung by a hornet will sometimes assuage the pain.

CANCER.

Cancer is believed to be upon the increase. It is in some mysterious way a product of civilization, for it has been ascertained that it is rare among savages. Hopefulness as to its arrest was never more prevalent than now, for institutions directed to searching for the cause of the disease, its amelioration, or its possible cure begin to appear. One in Philadelphia reports that there are three phases of the disease; in the first two of which there is reason to believe it can be arrested, but

in the last one of which the case is hopeless with the means at present at command. Research, however, may result in discovering the cause of the disease and lead to knowledge of how, in any phase, it may be extirpated. In October, 1906, a similar institution was opened in Baden, Germany.

If a cancer of a certain superficial sort is surgically removed before ulceration has proceeded far, the probability is that the disease will not return. In a deeper-seated variety the ulcer is funnel-shaped, it easily bleeds, and rapidly increases in width and depth, occasioning agonizing pain, enlargement of neighboring glands, impoverishment of the blood, and the sufferer dies of exhaustion.

Cancer of the skin seldom occurs before middle age, and it is more frequent in men than in women. The face is its favorite location, especially the cheeks and lips. In its early stages it is simply a disease of the skin and the blood is unaltered. This is the point of time, therefore, at which the excrescence should be removed by the knife or the x-rays; as soon, in fact, as it can be pronounced a cancer. A warty excrescence upon the lip of any person more than forty years of age should excite suspicion. It is, anyhow, a serious blemish and had better be removed. There is reason to believe than any long-continued irritation of the skin, as, for instance, by picking at it, may originate cancer.

The most rational treatment of the disease is early removal of the part where it has appeared. Cancerous growth may be destroyed by caustic, the x-rays, and by iron at white heat. The preferable procedure, however, is radical removal of the growth by the x-rays or the knife. A margin of apparently healthy skin is at the same time taken away. The operation may be so deftly performed as to leave an inconspicuously small scar. The employment of so-called "cancer salves" is responsible for much mischief and sacrifice of life.

The progress of cancer may be retarded by the restriction of the sufferer to the diet of bread, milk, vegetables, and fruits. Pain is relieved by one of the preparations of opium given with

the due precaution which only a physician is capable of using. When the disease is superficial, it may sometimes be cured by covering the affected surface with finely-powdered chlorate of potassium, giving the remedy internally at the same time, in ten-grain doses, three times a day. Aristol powder constantly applied to the sore has often produced good results. Strong carbolic acid used on the spot or spots, two or three times a week, may eradicate a superficial manifestation of the disease.

FRECKLES.

This common blemish is caused by the deposition of the coloring matter of the skin, produced in the highest degree by the conjoint influence of sun and wind. They may be removed by some mild caustic wash or ointment. A good ointment for the purpose consists of from five to sixty grains of copper oleate to the ounce of lard, or of lanolin or cold cream. From two to five grains of corrosive sublimate to the ounce of water is a good lotion. The following prescriptions can be recommended:—

Corrosive sublimate	10 grains.
Tincture of benzoin	½ ounce.
Glycerine	1 ounce.
Rose-water	5 ounces.
Mix. Mopped upon the surface every day.	
Lactic acid	½ ounce.
Glycerine	½ ounce.
Rose-water	½ ounce.
Mix. Mopped upon the surface every day.	
Oxide of zinc	2 drachms.
Corrosive sublimate	3 grains.
Distilled water of witch-hazel	2 drachms.
Glycerine	3 drachms.
Mix. Apply to the surface once a day.	
Chloride of ammonia	1 ounce.
Commercially pure hydrochloric acid.....	2 drachms.
Glycerine	4 ounces.
Elder-flower water, enough to make.....	½ gallon.
Mix. Apply with a sponge or piece of soft linen.	

Galvanic electricity, applied two or three times a week, often assists in the removal of freckles.

WENS.

The tumors known as wens are common upon the face and scalp and may occur upon other parts of the body. They arise from obstruction of the canals leading from oil-glands to the surface of the skin. Secretion accumulates within the glands and distends them, while at the same time the walls of the glands become thickened. The middle of the forehead is a favorite location for the appearance of a wen, which may vary from the size of a pea to that of an orange. In most cases there is a single tumor, but sometimes they are numerous. They are of a soft, semi-fluid consistency, according to the nature of their contents. They grow slowly, painlessly, and often remain stationary in size for many years, the skin covering them being perfectly healthy to all appearance. They generally develop in the range of time from youth to middle age. The only sure method of removing them is by incision. Every part of the inside wall of the tumor must also be removed, or it will be reproduced. The resulting scar is slight and much less disfiguring than the wen.

EXCESSIVE PERSPIRATION.

The cutaneous disorder of excessive perspiration may take place in limited regions of the body, or over its whole surface. It comes from a disordered condition of the sweat-glands, and may accompany consumption, rheumatism, pneumonia, malaria, and diseases of the nervous system, and may also depend upon poverty of the blood. The secretion may be constant or intermittent and may bathe one side of the body while the opposite side is entirely dry. It may occur periodically.

Sometimes the amount perspired is so great that it saturates the wearing apparel and bedclothes, and upon the palms of the hands may be seen to collect in drops and trickle from them in little streams. The scarf-skin, especially in the bends of the toes, peels off, leaving a very sensitive surface. In extreme

cases large blisters form on the feet. It is at times accompanied by tingling, itching, and burning sensations, and may lead to other diseases of the skin, especially tetter.

In this disease digestive disorder must be corrected by a simple diet, exercise, and medicines which promote secretion of the digestive fluids. If the sweating is caused by disturbance of the nervous system it may be controlled by the administration of the ammoniated tincture of valerian in teaspoonful doses, three or four times a day; by twenty grains of the bromide of potassium in water, and by the application of the cold douche. Remedies proper for rheumatism or gout, when the sweating is excited by those maladies, should be used.

Mild cases are benefited by bathing the affected surface in water as hot as it can be borne, mustard, vinegar, or camphor being added to the water. Bathing the surface with sulphur, tar, or naphthol soap in water may also have a good effect. Boric acid, corrosive sublimate, and salicylic acid dissolved in water or diluted alcohol restrain the secretion. One or two drachms of alum to a pint of water or of alcohol is a useful wash. Dry powders dusted upon the surface are often effectual. The oleate of zinc, salicylic acid, and naphthol are excellent remedies. When the disorder is rebellious to treatment and the feet are affected, diachylon-ointment or lead-ointment is a good application. The ointment is spread upon soft linen cut large enough to cover the foot, smaller pieces being placed between the toes, the foot bandaged, and the procedure repeated every day for one or two weeks.

The same chemicals just named in connection with good lotions for excessive perspiration may, of course, be employed in the form of ointments. Aristol, either alone or mixed with carbonate of zinc, subnitrate of bismuth, or some other dry and astringent powder is an excellent application.

A few formulæ for lotions, dusting-powders, and ointments are here appended:—

Corrosive sublimate 20 grains.

Distilled water of witch-hazel 4 ounces.

Cologne 4 ounces.

Mix. Use as a lotion.

Washed sulphur 30 grains.

Salicylic acid 10 grains.

Powdered arrow-root 4 ounces.

Mix. Use as a dusting powder.

Ergotin ½ drachm.

Carbonate of magnesium 1 drachm.

Hydrochlorate of hydrastine 10 grains.

Cold cream 1 ounce.

Mix. Spread upon the affected surface.

Aristol 2 drachms.

Boric acid 2 drachms.

Subnitrate of bismuth 2 drachms.

Oleate of zinc 2 drachms.

Mix. Dust upon the feet.

Powdered alum 1 ounce.

Powdered orris-root 2 ounces.

Powdered rice 2 ounces.

Mix. Dust upon the feet or other parts.

Salicylic acid 2 drachms.

Powdered arrow-root 2 drachms.

Subnitrate of bismuth 1 ounce.

Oil of bergamot 5 drops.

Oil of rose 2 drops.

Mix. Dust upon the feet.

ODOROUS PERSPIRATION.

Perspiration, like any other animal or vegetable product, acquires in decomposing an offensive odor. In certain cases the exudation has an offensive odor apart from decomposition. A peculiar odor is characteristic of certain races and of certain people, but this of which there is question here may be properly called diseased. Cases there are where it is so pungent and disagreeable that it can be perceived at the distance of a couple of yards. The malady depends upon some disorder of the nervous system and is most common in the feet, which sometimes become red and painful.

The affected parts, wherever they are, should be frequently bathed in water in which soap impregnated with naphthol, car-

bolic acid, or eucalyptus is used. Remedies calculated to strengthen the nervous system are generally demanded. Boric acid, salicylic acid, naphthol, alum, sulphate of zinc, sulphate of copper, and hydrastine are substances which are especially useful for external application in this complaint, and may be used either in the form of lotions or of ointments. Dusting-powders are also advantageous. The following preparations can be recommended:—

Boric acid 1 drachm.

Rose-water 1 ounce.

Distilled water of witch-hazel 2 ounces.

Mix. Apply frequently to the surface.

Powdered alum 1 drachm.

Subnitrate of bismuth 1 drachm.

Oxide of zinc ointment 1 ounce.

Mix. Use upon the affected parts.

COLORED PERSPIRATION AND LUMINOUS PERSPIRATION.

The color of perspiration is sometimes strangely modified, and may appear as blue, green, red, brown, or black. Some of these appearances may depend upon the presence of substances absorbed by the blood from the intestinal canal; the red color is due to the presence of a certain microbe. Some diseases of the nervous system may occasion the escape, through the sweat-glands, of a fluid containing blood. A case has been recorded by Kaster, in which the body-linen was rendered luminous by perspiration flowing after any violent exercise. The phenomenon is attributed to the decomposition of tissue coupled with the formation and oxidation of phosphorus; for in the case of persons taking phosphorus internally, other secretions besides perspiration have sometimes been noticed as luminous.

SUPPRESSED PERSPIRATION.

In some cases the perspiration is either partially or completely suppressed. The skin, in consequence, becomes dry and rough; pricking, itching, or burning sensations are often present. The affection may be owing to disease of the skin, the most notable manifestation of it being one in which the sur-

face is covered with large scales like those of a fish. It may occur in connection with tetter and other cutaneous diseases, in disorders of the nervous system, in consumption, diabetes, and cancer. It may be temporary or permanent.

In this affection great care must be taken to promote the health by a liberal diet, fresh air, exercise, and bathing. Massage, also, as promoting the functions of the skin, is beneficial. The Turkish bath, followed by massage, is especially to be recommended. When the skin is dry and cracked, bland oils or ointments should be used upon it. Cold cream, olive-oil, lanolin, either alone or else combined with a few drops of eucalyptus, are excellent applications. There are some medicines which, taken internally, have the power to act upon the sweat-glands. The most remarkable of these drugs is obtained from the leaves of a Brazilian plant, and is known as *pilocarpus* or *jaborandi*. These leaves may be made into a tea, but the preferable way of using them is as a fluid extract, the dose of which is from ten drops to a teaspoonful. Free perspiration, which continues for several hours, is soon excited by them and the ultimate effect is beneficial.

PREMATURE WRINKLES.

Wrinkles sometimes make their appearance as early as between twenty and thirty years of age, and more commonly in women than in men. Persons of light complexion and thin, delicate skins exhibit the greatest tendency of any to premature wrinkles. Women sometimes unconsciously acquire the habit of moving the skin of the forehead into transverse folds, in the expression of surprise, astonishment, or expectancy. The constant repetition of this action inevitably fixes lines which gradually deepen into wrinkles. All grimacing is objectionable from the social point of view, as it is also objectionable from the point of view of good looks. The best preservative against early wrinkling is a good state of the general health. Health promotes composure of mind and placidity of expression.

CHAPTER XVII.

ERUPTIVE FEVERS.

ERUPTIVE fevers represent an important class of diseases in which the different members of it are distinguished from each other by characteristic eruptions. These diseases occur, for the most part, during childhood, and, as a general rule, one attack is protective of the system for life. The diseases are measles, scarlet fever, chicken-pox, small-pox, and a peculiar affection known as German measles.

MEASLES.

Measles may occur at any time of the year, but it is most prevalent in spring and autumn. Scattered cases always exist in large cities but the disease is apt to sweep epidemically through a community. Most persons have had it in childhood, but cases of it among adults are by no means uncommon. The disease may be communicated by contact, whether directly with the sick person or indirectly with some object upon which its contagious matter has been deposited; or it may be disseminated through the air.

Some ten to twenty days after exposure to the disease its symptoms make their appearance. One of them is weakness followed by chilliness; and this, in turn, is followed by sickness at the stomach, fever, and headache. The patient sneezes and has a free discharge of mucus from the nose. The eyes become red and watery, the face flushed and swollen, and there is frequent and severe cough. Four to five days after the beginning of the attack, the characteristic rash of measles appears, first upon the face and chest, and then, within twenty-four hours, spreads over all parts of the body, although the eruption is generally most abundant upon the face. The rash is distinct for about two days, when it begins to subside. The patient is generally convalescent ten or twelve days after the beginning of the attack.

Measles, when uncomplicated, and of average severity, is not a dangerous disease. It is, however, liable to complications which may render it serious and even fatal. The most usual of these complications arises from extension of the inflammation of the throat and nose to the bronchial tubes and lungs. Bronchitis differs much in severity, dependent upon whether the large or the small bronchial tubes are affected. Attack of the former generally ends in recovery, whereas that of the latter is frequently fatal. The presence of bronchitis is announced, in addition to cough, by buzzing and wheezing sounds which are very plainly heard when the ear is laid upon the chest or the back of the sufferer.

Inflammation of the eye or of the ear sometimes occurs as a complication of measles. There is a form of the disease known as "black measles." In this the eruption is abundant and is of a dark red or purple color, the fever is high, the breathing rapid, the tongue brown and dry, and blood is discharged beneath the skin and from mucous membranes. Large discolored blotches appear upon the skin, the whites of the eyes turn scarlet, and haemorrhages take place from the nose, mouth, and other cavities. The sufferer is prostrated in strength and soon falls into a stupor from which he never revives. These severe cases are comparatively rare. They may, however, be common in certain epidemics. When black measles prevails as an epidemic, ninety per cent. of the persons attacked die.

A peculiar relation exists between measles, scrofula, and consumption. A child who was previously, to all appearance, in sound health before an attack of measles, may afterward exhibit scrofulous symptoms and be afflicted with sore eyes, running ears, various rashes, and swelling of the glands of the neck; and youthful adults after recovery from measles are not infrequently attacked by consumption.

It is of great importance to be able to recognize early the nature of eruptive fevers. The consequence of mistaking smallpox or scarlatina for measles might be not only prejudicial to

individuals, but also to whole communities. The final responsibility of making true decisions must rest upon physicians; but it is also important that parents should know the main differences among the symptoms of eruptive diseases.

In measles the patient should be placed in a well-ventilated room, and should be given a light but nourishing diet, such as milk toast and soup. Drinking freely of cold water or lemonade may be allowed, for they not only assuage the thirst, but have a good influence upon the secretions of the body. It is good practice, too, to bathe the face and neck with cold water four or five times a day. A light purgative should be given at the onset of the disease, and after this has operated, remedies for reducing the fever and allaying the cough are in order. A prescription which will answer these requirements is the following:

Syrup of ipecac.....	48 drops.
Sweet spirits of nitre	½ ounce.
Neutral mixture enough to make.....	2 ounces.
Mix.	

Of this medicine a teaspoonful can be taken every three hours. The dose is calculated for a child of six years of age. For a child of two or three years about half the quantity can be given, while for one of ten or twelve years, the quantity may be increased. If the child is very restless, five grains of the bromide of sodium or potassium may be advantageously given with the above medicine three or four times in the course of the day. When the eruption begins to fade and the fever to decline, the use of the fever mixture can be abandoned. At this stage of the disease it is beneficial to give a grain or two of quinine, according to the age of the child, three times a day. As, at this period, the cough is the most prominent symptom, a mixture for it may be thus composed:—

Chloride of ammonium	48 grains.
Tincture of sanguinaria	16 drops.
Syrup of wild cherry	½ ounce.
Water	1½ ounce.
Mix. The dose is a teaspoonful every third or fourth hour.	

When bronchitis or pneumonia occurs during the course of measles, more energetic measures are demanded. The sufferer should be enveloped in a "jacket-poultice." This is made of flaxseed-meal, with which is mixed mustard in the proportion of a tablespoonful of mustard to a half pound of the flaxseed-meal. They are made into a warm poultice and spread upon a large piece of soft linen, or included between two layers of linen. The poultice must be large enough to cover the whole of the chest and the back, and when placed in position it should be covered with a layer of oiled silk, which retains the heat and moisture of the poultice. When the poultice is changed another one should be ready to take its place at once. If the mustard burns too much its amount may be reduced, but a goodly amount is requisite. The sudden partial or entire disappearance of the rash announces a dangerous complication. For this reason the mustard poultice is used; to keep, by its stimulation, the circulation from departing from the surface of the skin and seeking the interior of the body, followed by the disappearance of the rash, which is popularly known as "striking in," and is a dangerous condition.

In the complication of bronchitis with measles, especially when the smaller bronchial tubes are involved, one of the best internal remedies is the carbonate of ammonium. This salt is stimulating, aids the breathing, the action of the heart, renders the bronchial secretion more fluid, and facilitates its expulsion by coughing. It may be compounded as follows:—

Carbonate of ammonia	1 drachm.
Balsam of Peru	2 drachms.
Water enough to make	2 ounces.

Mix. The dose for a child of six years is a teaspoonful, to be repeated every two or three hours.

Or doses of the following mixture may be given at the same intervals of time to a child of six years of age:—

Carbonate of ammonia	1 drachm.
Powdered gum-Arabic	2 drachms.
Powdered white sugar	2 drachms.
Syrup of tolu.....	1 ounce.
Water enough to make	2 ounces.

Mix. Dose, a teaspoonful every second or third hour.

Bronchitis of the fine bronchial tubes requires also the administration of wine, whiskey, or brandy, in amounts suitable to the age and the condition of the patient. Generally a half to a teaspoonful of whiskey or brandy in water may be given to a child of four years of age. If it cause flushing of the face and restlessness, the dose should be diminished, or it should be withheld until the excitement has subsided.

Jacket-poultices and the carbonate of ammonia are also useful in pneumonia. There are two varieties of pneumonia. In one of them the attack is abrupt and the bronchial tubes are comparatively unaffected. This is the form which is appropriately called "lung fever." In the other kind the inflammation spreads from the bronchial tubes to the lung-cells, and is therefore called *broncho-pneumonia*. This is the particular form which pneumonia assumes when it complicates with measles. *Broncho-pneumonia* is relieved by the same treatment which has been described as appropriate to bronchitis.

Malignant, or so-called "black measles," demands vigorous treatment. Its high fever must be reduced and extreme prostration combated. Cold baths are the most efficacious means of lowering the body's temperature. The strength is supported by stimulants, quinine, camphor, carbonate of ammonia, turpentine. The responsibility for the treatment of all varieties of measles can be borne only by a physician.

SCARLET FEVER.

In epidemics the disease existing varies very much in severity. For many years the majority of cases are mild in type, and then again they become exceedingly dangerous. Scarlet

fever, however, is always to be dreaded, for the lightest cases may be followed by grave or even fatal consequences.

The period in scarlet fever intervening between contagion and the first symptoms of the disease is shorter than in measles, varying from three to seven days. The first manifestation of the disease may be a chill, vomiting, and sometimes soreness of the throat. In very young or in very nervous children the disease may be ushered in with a convulsion. There are three varieties in its apparent severity in onset that are recognized by physicians. In the lightest form there is only slight soreness of the throat; in the next the throat symptoms are severe; and in the next the symptoms are obviously malignant.

In light scarlet fever the chill, vomiting, or sore throat is succeeded by fever, dry skin, flushed face, rapid breathing, and irritable stomach. The tongue in the middle is yellowish or whitish in color, red on its edges and tip, and the throat unnaturally red, accompanied by pain in swallowing. The glands of the throat are somewhat swollen. After twenty-four or thirty-six hours, the rash appears upon the face, neck, and upper part of the breast before it invades other regions. In exceptional cases only it manifests itself first upon the limbs. This rash, as implied by the name "scarlet fever," is of a bright red color. It is most vivid upon the bends of the joints, the elbows and knees.

With the development of the rash the tongue assumes an appearance known as "strawberry tongue," from its being studded with small elevations. The fever begins to abate after four or five days, and as it declines the condition of the throat improves and the rash gradually fades. This period of subsidence of these symptoms generally lasts about three days. After the rash has disappeared the skin becomes rough and the scarf-skin is shed in small fragments by a process known as "peeling."

In the second variety of the disease the fever is higher and lasts longer than in the first, and all the symptoms are more intense. The throat is very red, the mucous membrane of

it swollen, ulcerated in places, and perhaps covered with a yellowish deposit resembling that formed in diphtheria. The act of swallowing is difficult and painful, the glands of the neck are swollen, hard, and painful. The fever often gives rise to delirium, and it is not until the eighth or ninth day that it begins to abate. Convalescence, in this variety of the disease, is not established until the end of the second week. In bad cases extensive ulceration takes place within the mouth, and the patient is utterly prostrated; delirium, stupor, and death may close the scene at the end of a week or ten days.

Malignant scarlet fever is a terrible and fatal disease. The fever in it is very high, there are convulsions, or else a condition of stupor, the breathing irregular, the throat swollen and covered with membrane, the glands of the neck enlarged; haemorrhages occur, and death usually closes the scene on the third or fourth day. In this variety of the disease the eruption, instead of being scarlet, is of a dark or a purplish color.

Relapses of scarlet fever occasionally occur from the second to the seventh day after recovery from the first attack, and the second one has all the symptoms of the first.

After severe cases of scarlet fever the scarf-skin peels off in large flakes. Sometimes it is detached from the fingers or the toes so completely that it looks like a mold of those members. An attack of the disease may also be followed by loss of the hair and nails.

Scarlet fever, besides being a dangerous disease, is also to be dreaded on account of the complications to which it may give rise and the consequences which may follow the subsidence of the fever. In mild cases of it the inflammation of the throat is not great and soon subsides; but in severe ones where the inflammation is great, it may spread to neighboring parts. The glands of the neck may become actively inflamed and a large and painful abscess be produced. The cellular tissue of the neck may become involved, large and deep ulcers may form and may cause haemorrhage by dividing blood-vessels. If attacking both

sides of the neck, haemorrhage, blood-poisoning, and exhaustion may arise, followed by death.

From the throat inflammation may extend to the ear, of which there are three parts: the ear external, middle, and internal. Along a canal from the external ear inflammation may extend from the throat to the middle ear. The middle ear, the drum, is connected with the upper and back part of the throat by a canal. Along this canal inflammation may, in consequence, extend from the throat to the middle-ear. When this takes place in scarlet fever the canal becomes swollen and its calibre contracted. Matter forms within the middle, the drum of the ear, and produces headache and deafness. The pain is often severe and even agonizing. If a child is too young to explain how it suffers, it will press the ear involved with its finger, or lay its ear against the pillow. If the cause of the distress be not detected, the thin membrane involved bursts, the enclosed matter escapes, and a perforation is left in the drum-head of the ear, which means, as a finality, more or less impairment of hearing. The drum-head may, indeed, be entirely destroyed and hearing totally lost in the affected ear. In most cases but one ear is affected, but both ears may be involved, and thus scarlet fever may be followed by total and permanent deafness.

Sometimes another serious complication of scarlet fever is diphtheria. Malignant scarlet fever has some resemblance to, but is not diphtheria. Diphtheria complicates scarlet fever upon occasions. It is characteristic of diphtheria that it more readily attacks a diseased than a sound surface. This is easily seen in epidemics of diphtheria. Persons who suffer from an ordinary sore throat, from cold or indigestion are particularly liable to contract diphtheria. It is a disease of the general system, and may develop in connection with wounds of the skin. A sore throat that is ulcerated by scarlet fever affords the best possible soil for its development. Then there combine, in that case, two serious diseases co-existing in the same person, and the prospects become proportionally gloomy.

Disease of the joints is not an uncommon suite of scarlet fever. Scarlatina-rheumatism, as it is called, principally attacks the ankle, wrist, joints of the fingers and toes, and may shift from one joint to another. This variety of rheumatism agrees with the typical one, in respect that it tends to cause a disease of the heart. A nervous affection which, in a large number of cases, is dependent upon rheumatism, is St. Vitus's dance, which has been occasionally noted as following scarlet fever.

Pleurisy sometimes follows scarlet fever. Its presence is announced by a rise in temperature, pain in the side, especially upon taking a long breath, and by a dry, hacking cough. Each lung is surrounded by a thin, delicate membrane, known as the *pleura*. It is inflammation of the *pleura* that constitutes *pleurisy*. Soon after the onset of the disease, the limpid fluid contained within the *pleura* becomes enormously increased, distending the sac with its accumulation. The lung is thus compressed by the fluid surrounding it, and the air may be completely driven out of its cells. When the inflammation subsides, the fluid is rapidly or else slowly absorbed, and the lung is again able to expand to its natural size. There are two varieties of pleurisy. In one of them the fluid is of a watery character, but in the other it consists of matter. It is the latter which is the form more likely than the former to complicate scarlet fever. The symptoms of the two forms are at first identical, but continued presence of matter in one case affords the symptoms of hectic fever, loss of appetite, and progressive debility.

When dropsy occurs as a consequence of scarlet fever, it appears when the scarf-skin is peeling. One of the commonest causes of dropsy is disease of the kidney, and it is upon this condition that the dropsy of scarlet fever depends. Mild cases of scarlet fever are almost as likely to be followed by kidney-disease as the severe cases, and the actual danger is perhaps greater in the former than in the latter instance, for the reason that persons who are ignorant of the nature of scarlet fever are apt to relax their vigilance over the convalescent as soon as the

fever of the disease has departed. Cases are witnessed in which it is almost impossible to keep the little patient in bed, so light is the fever and so exuberant the child. But, exposed to a draught, the case which begins so mildly may have a fatal termination. The kidneys are often congested from an early period of the disease; but if the child is well watched and protected from draught, they resume their healthy condition. On the other hand, their congestion may, as a consequence of a single imprudence, be converted into inflammation, and death may ensue, or else the foundation of Bright's disease of the kidneys may be laid.

Dropsy usually makes its appearance as a puffiness beneath the eyelids; the feet and ankles are often swollen, and the legs become enlarged all over by an accumulation of fluid in their tissues. One sign of the presence of fluid is the easy pitting of the skin upon pressure by the tip of the finger. The skin has a doughy feeling, and the indentations made by pressure with the fingers remain for some time. Dropsy of exterior parts is not in itself dangerous, it is only indicative of serious disease of the kidneys. Inflammation of the larynx may reach such a point that, unless surgically relieved, the patient must die, for it may stop the breathing. This acute inflammation of the larynx may occur as a complication of scarlet fever. Dropsy of the larynx, on the other hand, is unaccompanied by inflammation. In it, the attack is usually sudden. The voice may not be at first affected. The prominent symptom is difficulty in the act of taking in the breath. The effort in doing so produces a harsh noise. Development of swelling is so rapid that within twenty-four to thirty-six hours there is great embarrassment in breathing. It must be obvious, therefore, that dropsy of the larynx is an extremely dangerous affection. The difficulty of breathing is a consequence of the presence of the fluid, and the presence of the fluid is caused by grave disease of the kidney.

Dropsy of the heart is the overwhelming of the organ by fluid. The heart, like the lungs, is enclosed in a membrane.

When this is invaded by dropsical fluid, the heart beats rapidly, irregularly, and feebly, and the sufferer becomes faint. Blood coagulates within the cavities of the heart, the circulation is arrested, and death ensues.

In addition to the evidence afforded by the presence of dropsy, that the kidneys are affected, is that afforded by the condition of the urine. The urine becomes scanty, highly colored, perhaps from admixture with blood, and of a dark, reddish brown. As the function of the kidneys is to remove from the blood waste-products which are injurious if retained in the body, it is evident that their diseased condition seriously impairs their capacity for work. The sufferer becomes weak, appetite is lost, the breathing is embarrassed, diarrhoea is frequent. If the function of the kidneys is very much impaired or abolished entirely, the poison absorbed by the body causes the sufferer to fall into convulsions or into profound stupor. Medical treatment may possibly save, but in many instances the poison in the blood is fatal. Within the brain are several cavities which, in diseases of the kidneys, may become distended by an effusion of fluid. This causing pressure upon the nerve-centers, the patient falls into stupor and death may occur within twenty-four hours. These conditions may occur as superinduced by scarlet fever.

In treating a child attacked with scarlet fever the following procedures should be adopted:—

The first essential of treatment is isolation. The child must be placed, if possible, in a room distant from the rooms occupied by others of the family, preferably at the top of the house. If practicable, the other children of the family should be sent away, but not, if they are likely to have already experienced contagion, to any place where there are other children. The bedroom of the invalid should have a moderate temperature and be well ventilated. The room should be bared of every unnecessary article of furniture, carpets, pictures, curtains, etc. The physician and the nurse are the only persons who should be

allowed to enter the room. It is a good practice to purify the air of the room by a mixture composed of one ounce each of carbolic acid and the oil of eucalyptus to seven ounces of the oil of turpentine. Two tablespoonfuls are added to a quart of water, put in a flat-bottomed vessel, and kept simmering over a fire. Another good disinfectant is composed of eight ounces of sulphate of zinc, one ounce of carbolic acid, and three gallons of water. A piece of muslin a foot square, constantly wetted with this solution, may be hung up in the sick-room and another in the adjoining entry. Articles which may have come in contact with the patient should be either disinfected or destroyed by fire. Discharges of any sort should be disinfected and immediately removed.

The sudden outbreak of the rash in scarlet fever does not usually leave the observer in doubt as to the disease. A chill, or a convulsion, fever, sickness at the stomach, sore throat, and a rapid pulse, aided, perhaps by knowledge that scarlet fever is prevalent, will generally result in a correct opinion of the case. In a week, or a week and a half, the accompanying fever abates, and the question of proper nourishment for the convalescent is not so difficult as it is in fevers of longer duration. Nevertheless, the fever, although comparatively short, is active while it lasts, and leaves the convalescent much exhausted, and it is therefore important that as much proper nourishment should be supplied as the digestion will permit. Milk, beef-juice, light soup, milk-toast should be given every fourth hour during the day. Unless the prostration be extreme, it is not advisable to wake the convalescent for the purpose of giving food. The watchful nurse can generally find opportunity for the administration of both medicine and nourishment two or three times during the night.

External applications of fats or oils moderate the heat of the fever and allay the itching of the skin, contributing much to the comfort of the sufferer. Little children, after having once experienced its pleasantness, often ask to be greased. At a later

period, when the skin is peeling off, anointing hinders dispersal of the scales and is therefore of use in preventing spread of the disease. Leaf-lard, bacon, and the fat of ham are very good substances for anointing, and so is olive-oil. Cold cream, or simple ointment, which is lard stiffened with one-fourth part of yellow wax, is a good preparation. Carbolic acid, boric acid, menthol, eucalyptus, are among the substances used in preparing ointments to diminish the heat of the fever and the itching of the skin. The formulæ of some serviceable preparations are here-with appended:—

Powdered starch	1 drachm.
Oil of chamomile	5 drops.
Simple ointment	1 ounce.
<i>Mix.</i> Spread upon the skin.	
Camphor	5 grains.
Prepared suet	1 ounce.
Ointment of rose-water	1 ounce.
<i>Mix.</i> Spread upon the skin.	
Borax	½ drachm.
Powdered starch	1 drachm.
Lard	1 ounce.
<i>Mix.</i> Spread upon the skin.	
Carbolic acid	½ drachm.
Oil of eucalyptus	½ drachm.
Olive oil	7 ounces.
<i>Mix.</i> Spread upon the skin.	

Sulphur is a valuable medicament, but its odor may prove an objection to it in the early stages of scarlet fever, when the stomach is irritable.

In mild cases of scarlet fever, where the throat-symptoms are not distressing, the patient may drink freely of cool water, or if old enough, may be permitted to suck little pieces of ice. If soreness of the throat is a prominent symptom, the deposits of membrane there must be removed by mopping the surface with a solution of common salt, borax, chlorate of potassium, or thymol. Two grains of corrosive sublimate to the pint of water is an excellent disinfectant when mopped on the affected surface. Gargles are also serviceable in removing the effete mat-

ter accumulated in the throat. Yeast makes a very good gargle. A good one is compounded as follows:—

Boric acid	2 drachms.
Borax	2 drachms.
Chlorate of potash	2 drachms.
Tincture of myrrh	1 ounce.
Water	7 ounces.

Mix. Of this mixture about two tablespoonfuls may be added to a glass of water and used freely as a gargle.

In the event a child is too young to gargle the throat, and in the case of older children, the use of the spray, after the throat has been cleansed, has of late years largely superseded that of mopping. Instruments called atomizers, used for administering the spray, are to be found at all druggists' stores.

When the throat is covered with unhealthy secretions, the following mixture will prove useful:—

Chlorate of potash	2 drachms.
Carbolic acid	½ drachm.
Tincture of iron	½ ounce.
Glycerine	1 ounce.
Lime-water enough to make.....	½ pint.

Mix. Spray into the throat every two or three hours.

One of the most cleansing of applications for the throat is peroxide of hydrogen or hydrogen dioxide. It gives pain when applied pure to the mucous membrane or to the skin, and for medicinal purposes is therefore supplied as dissolved by druggists, in water. In the diluted form, sprayed into the throat, it exercises remarkable cleansing power, dissipating matter wherever it is met with.

Another efficient cleansing agent is chlorine. Properly diluted, its cleansing power is retained. A preparation containing chlorine is known as Labarraque's solution. This, properly weakened, is another cleansing fluid. Chlorine-water, suitably diluted, also makes another. A teaspoonful either of Labarraque's solution, or of chlorine water, diluted with three or four ounces of water, makes a strong enough solution for a spray for the throat of scarlet fever patients.

When the tonsils are greatly swollen they should be painted with the tincture of chloride of iron. If matter appears, it must be liberated by a surgeon's operation. Drosy of the larynx is so serious an affection that the promptest surgical treatment is demanded.

Inflammation is frequently found to spread between the back of the throat and the cavity of the nose. The nose thus becomes quite frequently involved in scarlet fever, producing a discharge from it which makes the upper lip sore. For injecting into the interior of the nose, for this condition, the same solutions as those used for the throat are applicable; but, inasmuch as the lining of the nose is more sensitive than that of the throat, they must be weaker. A teaspoonful of this weakened mixture should be injected into each nostril every second, third, or fourth hour, according to the gravity of the case.

Inflammation of the middle ear is so painful, and the possible consequences already described so serious, that this complication demands the most careful and competent medical supervision. Warm applications, dry or moist, relieve pain. A bag containing hot table-salt or hot chamomile flowers, or a light hop-poultice affords a certain degree of relief. Filling the canal of the external ear with warm water, as hot as it can be borne, to which a few drops of laudanum have been added, is of service in assuaging the pain. Sweet-oil containing a few drops of laudanum is another application that may be made to the ear.

If these measures are not speedily efficacious, a leech applied behind the ear will afford relief, and may prevent further progress of the inflammation. If the disease cannot be checked by this procedure, the ear must be inspected by a skilled aurist, and if he find the membrane of the middle ear distended by matter, he will operate so that it shall escape. The sudden deliverance from pain which this operation effects is wonderful. The child, worn out by suffering, falls into a gentle sleep.

Nothing has yet been said about internal treatment for scarlet fever. The question at once arises, Is there any medicine that is able to arrest the disease after a child has been ex-

posed to contagion? The claim that belladonna has this power has not been demonstrated by experience. Other drugs have been employed with the design of neutralizing the disease, but the testimony in their favor is insufficient to produce confidence in their efficacy.

Mild cases of scarlet fever do not require very active treatment by medicine. It is generally advisable to administer two or three doses of laxative medicine at the beginning of the attack of the fever. A dose of such medicine may be given every other night. Calcined magnesia and the solution of citrate of magnesia are medicines very good as aperients. As a regular medicine the most efficient is the chlorate of potassium, which can be given to a child of six years in the dose of three or four grains in water. The solution may be prepared according to the following formula:—

Chlorate of potash	2 drachms.
Syrup of orange-flower water.....	1 ounce.
Water	3 ounces.
Mix. Give a half to a teaspoonful every third hour.	

When the irritability of the stomach has subsided it is well to add five to fifteen drops of the tincture of the chloride of iron to each dose.

The chlorate of potash is an excellent remedy for soreness of the throat, and hence its peculiar value for that purpose in scarlet fever. It has also good influence upon the blood, tending to prevent extensive destruction of its red corpuscles.

When the fever has abated, some tonic, such as the tincture of the chloride of iron, or a grain of quinine, three times a day, may be given with advantage.

In some cases the bowels become loose simultaneously with the onset of the fever. In that event administration of a laxative would be prejudicial; it might even become necessary to administer some corrective for the looseness of the bowels. For a child of about five years of age, a good corrective is a dose of three drops of aromatic sulphuric acid well diluted with

water. A five-grain powder of subnitrate of bismuth every two or three hours is also generally sufficient to check the looseness.

The treatment of more severe cases of scarlet fever than the mild one, while the fever is quite high and accompanied by much trouble in the throat, is substantially the same as that which has been already outlined. The most efficient and safest manner of reducing the temperature of the fever is by the employment of cold water. The abstraction of heat from the body by means of cold water retards the consumption of tissue, quiets restlessness, and produces amelioration of symptoms. It is a good practice to sponge the body three or four times a day with cold water. In cases marked by high fever and a bad sore throat, the application of cloths wrung out in cold water, or even the application of the ice-bag to the throat, answers the purpose of allaying heat, reducing excitement, and improving the condition of the throat.

It is also useful to cover the head with the ice-bag filled about one-third with cracked ice. Pieces of soft linen, wrung out in ice-water, wrapped around the arms, or laid upon the chest and abdomen, are likewise effectual means of diminishing temperature. The same object may be accomplished by means of the wet-pack. The mattress being protected by a rubber cloth, a sheet saturated with cold water is drawn under the patient and its sides folded over the body. The extreme heat of the body soon warms the sheet and vaporizes the water, whereupon the sheet saturated in cold water must be renewed. Among children the wet-pack possesses the advantage over the cold general bath that it does not create in them so much nervous excitement, shrinking, or shock.

In the most severe cases the poisonous action of the disease upon the brain, spinal cord, and general nervous system is so profound that the patient either suffers from convulsions or lies in an apathetic condition. Convulsions in scarlet fever occur at two different periods, and from two different causes. They may usher in the disease, indicating the disturbance of the ner-

vous centers, or they may occur during the period of peeling of the skin; indicating, at either time, the presence of disease of the kidneys. The convulsions of the early period are allayed by those measures which reduce the fever. After the fit is over, the application of the ice-bag to the head or of the wet sheet to the body will prevent its recurrence.

In the worst cases of scarlet fever, especially in those of the malignant variety, it is essential that the patient be immersed in a bath-tub. Such cases show an extremely high temperature, and a fatal result is immediate. The patient should be put in a bath of a temperature of ninety degrees, Fahrenheit. This should be gradually reduced by the addition of cold water until the temperature has fallen to seventy-seven degrees. A medical thermometer should be placed and kept in the patient's mouth until his temperature is reduced by two or three degrees, when he should be placed in bed. If the cold has had too depressant an effect, indicated by shivering or blue lips, he must be stimulated by a dose of whiskey and the heaping up of bed-clothes over him.

Cases which exhibit great prostration, rapid emaciation, restlessness, and delirium, require the administration of stimulants. These may be given in the form of an alcoholic liquor, wine, whiskey, brandy, or what is perhaps better, some preparation of ammonia. The ammonia and the alcoholic liquor may be acceptably combined, as in the following composition:—

Carbonate of ammonia	$1\frac{1}{2}$	drachms.
Whiskey	2	ounces.
Pulverized white sugar	$\frac{1}{2}$	ounce.
Powdered gum-Arabic	$\frac{1}{2}$	ounce.
Water enough to make	4	ounces.

Mix. Dose, a teaspoonful for a child six years of age.

It may be better to omit the whiskey from the mixture, and to increase or diminish its amount from observation of the effect produced. Alcoholic liquors are very beneficial if properly used, but they may, otherwise treated, prove very injurious. Intoxication has been occasionally observed in young children in con-

sequence of indiscreet administration of alcoholic drinks. Overdose of alcoholic liquor weakens the action of the heart and occasions serious depression. Ammonia has the advantage over it of not only not causing depression, but of stimulating beneficially the action of the heart and the great blood-vessels.

If the fever of the disease be happily over, the case has by no means ended. The process of peeling may extend over several weeks, during which time the child must be kept in the house at an equable temperature, and must be sedulously protected against draughts. It should not be allowed to venture out of doors until the healing process has entirely ceased. If signs of ailment should reappear, slight fever, headache, backache, together with scanty and highly colored urine, the kidneys must be relieved by action of the bowels and the skin. The child should be put to bed at once in a room of a temperature from seventy-two to seventy-five degrees Fahrenheit. The diet should be composed of milk, soup, corn-starch, tapioca, etc. Render the skin active by giving the child a bath of immersion of a temperature from ninety-five to one hundred degrees, Fahrenheit. In a quarter of an hour place the child in bed and cover it with warm blankets. Excite perspiration by putting in the bed bottles of hot water, or the usual rubber bag filled with hot water. The fluid extract of jaborandi, dose five to ten drops in water, induces profuse perspiration. This drug is comparatively ineffective in children less than four years of age. In older children and in adults it causes so great a perspiration as to drench the bed-clothing. The dose can be repeated at intervals of a day or two, according to the circumstances of the case.

It is not advisable in affection of the kidneys following scarlet fever to give medicines which decidedly stimulate the kidneys. Those which are gentle in their effect are of service. The acetate and the bitartrate of potash, or cream-of-tartar, may be given. To a child of six years of age, the dose of the former is from one to twenty grains, three or four times daily; and of the latter, three to thirty grains. The bowels may be kept open by

the administration of calcined magnesia or of the citrate of magnesia. For the same purpose, five to ten grains of the compound powder of jalap may be given to a child of six years of age.

Mustard-poultices, dry-cups, and leeches are useful for the relief of congestion of the kidneys.

The convulsions of the early stage of scarlet fever may be controlled by the use of bromide of potash and chloral hydrate, each alone or combined. A prescription in which they appear is as follows:—

Bromide of potash	$2\frac{1}{2}$	drachms.
Chloral hydrate	40	grains.
Syrup of orange-flower water.....	$1\frac{1}{2}$	ounce.
Water	$\frac{1}{2}$	ounce.

Mix. A teaspoonful is a dose for a child six years of age, every three or four hours.

Scarlatinal rheumatism following scarlet fever usually passes off within a few days, and the tenderness of the joints is relieved by swathing them in soft cotton wool. The tenderness may also be removed by rubbing the parts with a liniment thus composed:—

Laudanum	2	drachms.
Chloroform	2	drachms.
Tincture of aconite	2	drachms.
Soap-liniment enough to make	4	ounces.

Mix.

No prescription beyond the simplest for treatment by medicines taken by the mouth for mild cases of scarlet fever have been here given. In the treatment of more severe cases the knowledge of a physician for the administration of powerful remedies that may be necessary is absolutely indispensable. It stands to reason that all that has been here written is for popular information, in order to bring to the average household true appreciation of the seriousness of scarlet fever as a disease through a medium of knowledge that may be useful upon its onset. When scarlet fever invades a household the very best judgment is to at once secure a physician. What has been here descanted upon ought at least to secure one point: that the

physician be quickly obtained, for after what has been said it is hardly possible that any reader should not recognize the symptoms of the disease, and perhaps anticipate the coming of the doctor by judicious measures of preparation.

GERMAN MEASLES.

The disease of German measles, known also as French measles, is sometimes puzzling, from the similarity of its symptoms to those of true measles and those of scarlet fever. German measles, like true measles, generally occurs in childhood. It is a contagious disease. As a general rule one attack of it is protective through the remainder of life. It does not, however, protect the system from an attack of true measles or of scarlet fever, which fact affords conclusive evidence that it is different in its nature from those diseases. Indeed, true measles and German measles may prevail almost simultaneously, and a child have first one and then the other.

The first symptoms of German measles are fever, headache, and a sensation of languor. The fever is not high, rarely exceeding one hundred and one degrees Fahrenheit in temperature, and the headache is rarely severe. There is slight redness and swelling of the throat, and the eyes may be red and watery. There may be some sickness at the stomach, but the patient does not often vomit. Not infrequently the rash is the first thing noticed. At the end of one or two days, but sometimes not until the third day, the rash develops. As a general rule it makes its first appearance on the scalp and thence rapidly extends to all parts of the body. It consists of small, rose-colored spots, from the size of a pin's head to that of a small pea, slightly elevated above the surface of the skin. It reaches its maximum in about twenty-four hours, remains without much change for a day or two, when it begins to fade away and entirely disappears on the fifth or sixth day. There is no peeling off of the scarf-skin, but a slight discoloration may for some time remain on the skin where the spots of the rash have been.

German measles may, at its onset and throughout its course, be distinguished by its symptoms from scarlet fever. It lacks the abrupt invasion, the sickness at the stomach, the high fever, and the sore throat of scarlet fever. The rash of scarlet fever is of a bright red color, occurring in large patches, which coalesce so as to cover a large surface of the body. The rash of German measles, on the contrary, is in the form of small and generally separate spots, which, although neighboring spots may coalesce, never do so to the extent of covering a large surface. The rash of true measles consists of comparatively large pimples of a crimson color and crescentic outline, decidedly elevated above the general level of the skin, presenting a mottled appearance. The face is swollen, the eyes suffused with moisture; there is discharge from the nose, sneezing, and a cough. These symptoms, like those of a heavy cold, are entirely absent in German measles, and the eruption does not appear until the third day.

The disease of German measles is so trivial as scarcely to need medical treatment. It is well to have the bowels acted upon by Epsom salts, citrate of magnesia, or a seidlitz powder. If there is enough fever to make the patient restless, sweet spirits of nitre or neutral mixture may be given. If there is soreness of the throat some chlorate of potash may be added. The diet should be light.

SMALL-POX.

The loathsome and disfiguring disease of small-pox seems to have originated in the East. The Chinese were familiar with it 1000 B. C., and it was also anciently known in India and gradually spread to Europe. That happened in comparatively modern times, for the disease was unknown to the Greeks and the Romans. It was described in the fifth century of our era by Arabian physicians, and was brought into Western Europe by the Crusaders, whence it found its way to America.

Four distinct varieties of small-pox are recognized by physicians. They differ as to the abundance of the eruption

and the intensity of other symptoms. The first manifestation of the disease appears from five to fourteen days after contagion. A second attack of it is very rare, but it may happen.

In the interval between exposure to contagion and the outbreak of the disease, there are usually no signs of impaired health. Occasionally, however, and especially towards the end of this period, the approach of the disease is foreshadowed by loss of appetite, sleeplessness, and languor. The mildest form of the disease is known as *varioloid*. It is true small-pox, although light in form. The next form in severity is known as *discrete small-pox*, because the pock eruptions stand well apart from one another, and scattered. The next variety, growing in severity, is known as *confluent small-pox*. In this the eruption is so abundant that neighboring pocks coalesce. The last and severest type of the disease is called, on account of its virulence, *malignant small-pox*.

In varioloid the severity of the disease is mitigated by vaccination, by previous attack of the disease, or by some personal peculiarity of constitution. It begins with a slight chill, followed by moderate fever. There is but little disturbance of the stomach, and the backache is not severe. The eruption is generally a day later in making its appearance, coming out upon the evening of the fourth instead of the third day. The pimples are transformed into blisters, and these become partially or wholly filled with matter, which, however, soon dries up. There is no secondary fever, little or no pitting, and convalescence is generally rapid.

Discrete small-pox usually begins with a moderate chill, dull headache, and pain in the small of the back. The stomach is irritable and the patient is disposed to vomit. The chill soon ceases, and is followed by high fever, the headache increases, and the pain leaves the back to center in the hips and thighs. The face is flushed, the eyes red, the breathing rapid, the skin hot and dry. The tongue is heavily coated with a white fur, the mouth parched, thirst incessant, and vomiting frequent. There is much restlessness, and there may be slight delirium.

The rash of discrete small-pox comes out at the end of the third or the beginning of the fourth day. It first appears upon the face and scalp and around the lips, spreading thence to the chest and arms, and successively to other parts of the body. The eruption is not confined to the skin; it also attacks the mucous membrane of the throat, larynx, and windpipe, and may even extend into the lungs, exciting pneumonia. It is upon the skin, however, that the eruption exhibits its stages of evolution. As soon as the eruption begins to appear, the other symptoms of the disease ameliorate; the fever declines, the headache and backache diminish or even disappear, the stomach becomes settled, the patient is able to take nourishment, and indeed feels convalescent.

The first appearance of the rash is in the form of small red points. These rapidly enlarge, appearing as extremely hard, red pimples, so hard that they have been likened to shot embedded in the skin. Each pimple stands distinctly apart from others, although they sometimes appear as clusters. They generally develop within twenty-four hours and give rise to itching, no increase to their number following their appearance. They slowly grow in size for two or three days until the seventh or eighth day after the beginning of the disease. The water-blister into which they become transformed have a dent on top, as if drawn inward. This peculiarity is characteristic of the small-pox eruption in the blister stage of the disease, and is not present save in rare cases in any other malady. Taken in conjunction with headache, severe backache, nausea, fever, and preceding outbreak of pimples, the water-blister dented on top, one is enabled confidently to pronounce the case to be one of small-pox. At their maturity, the blisters are of about the size of a small pea, hemispherical in form, and their watery contents are changed into matter.

With the arrival of the formation of matter in the eruption, the febrile symptoms, which have been in abeyance for four or five days, return. This constitutes the symptomatic or second-

ary fever, and is higher than the first. The rapid breathing, headache, backache, and vomiting recur in an intensified degree. The skin becomes swollen and the face disfigured even when the eruption is not profuse. The patient sometimes lies in an apathetic condition, or may be delirious. The delirium may be of a wild form, or may be of the mild type where the patient continually mutters in a low voice. The nose and throat are inflamed, and the act of swallowing is painful. Bronchitis, pleurisy, or pneumonia sometimes occurs during this period. There is itching in all stages of the disease. The soft white pimples are often torn by scratching, provoked by the itching of the eruption, by pressure of the bed-clothing, or by spontaneous rupture, at which times the matter oozes out of them and dries in crusts upon the skin.

About three days after the formation of matter, it begins to dry up; a dark brown spot appears in the center of each pimple and enlarges until it forms a brown scale closely attached to the surface upon which it rests. This is known as the period of desiccation (drying), and it usually begins on the thirteenth or fourteenth day of the attack. The secondary fever lasts for three or four days and declines as soon as the matter begins to dry into crusts. The constitutional symptoms abate, and the patient becomes convalescent. The skin heals beneath the crusts; but as a portion there of the true skin has been destroyed, little pits, representing permanent scars, remain on the skin. The disease lasts about three weeks. During convalescence the hair is often lost and the nails are sometimes shed.

CONFLUENT SMALL-POX.

In the confluent variety of small-pox the invasion of the disease is quicker than that just described, the attack more violent, the eruption more extensive, the remission of fever but slight, the secondary fever more severe and dangerous. Complications are also much more frequently encountered. The chill which announces the disease is violent, long-con-

tinued, and followed by other chills. The headache and backache are excruciating, the primary fever is very high, quite often there is copious bleeding from the nose, and there is much sick stomach. Convulsions may take the place of chills. The fever is so violent that the attack has sometimes been mistaken for *delirium tremens*. Cases are not uncommon where patients have escaped from their attendants and wandered in their night-clothes far from home on a bitterly cold winter's night.

The eruption appears upon the third day and spreads over the whole body in the course of a few hours. The skin is rough from innumerable closely-set, hard, red pimples; so close, in fact, that scarcely a trace of healthy skin can be discerned. On the day succeeding their appearance they become converted into blisters which may become very large from joining with those close to them. The blisters soon become full of matter and the appearance of great quantities of it on the swollen skin presents a terrible appearance. The coalescence of the blisters upon the face and hands is especially noticeable. The face is enormously swollen, repulsive to sight, hardly recognizable by the most intimate acquaintance. The eruption also invades the mouth. There unhealthy deposits of yellowish white substance take place, the tongue is swollen and laden with a heavy fur. The voice is lost, breathing and swallowing are difficult. A peculiarly offensive and sickening odor is exhaled. The disease may become complicated with erysipelas, with the consequence of much destruction of tissue. Pocks may form upon the eyeballs, causing either opacity of the eye or perforation of the eyeball and consequent blindness. Bronchitis, pleurisy, and pneumonia are of frequent occurrence in this form of small-pox. If recovery eventually takes place the patient is left with a much-scarred and disfigured face.

MALIGNANT SMALL-POX.

Still more violent than confluent small-pox is the course of the malignant variety of the disease. The beginning of it is very abrupt, the chill extremely severe, the fever exceedingly

high, the acts of breathing rapid and irregular. The headache and backache are excruciating and vomiting is constant. Delirium, usually followed by stupor, soon occurs. The eruption appears upon the third day, its pimples being dark blue or even black in color. The pimples run together and form large, irregular masses. Around them may generally be seen large or small discolorations of the skin, indicative of haemorrhage within the skin. The face is immensely swollen and the whites of the eye become blood-red. Haemorrhages from the nose, stomach, and bowels often occur. The disease is usually complicated with bronchitis or with pneumonia. Death results within a week from the beginning of the attack, often upon the third or fourth day, and not infrequently before the development of the eruption.

In view of the highly contagious character of small-pox, the rapidity of its spreading, the disfigurement which it causes, and its dangerous character, it is highly desirable that it should be recognized immediately upon its attack. Prior to the appearance of the eruption the symptoms upon which reliance should be placed are pain in the back, sickness of the stomach, chill and fever. Whenever these symptoms occur during the presence of a small-pox epidemic an inroad of the disease should be suspected and the patient should be at once isolated. When the eruption first makes its appearance it is not easily distinguishable from that of measles. Both kinds of rashes consist of pimples. The pimples of small-pox, however, are much harder than those of measles. The pimples of measles, on the other hand, are larger and crescentic in shape. The rash of small-pox appears upon the third, but that of measles not until the fourth day. Therefore the symptoms of the two diseases do not present similarity except to an inexperienced person. The watery eye, the sneezing, the discharge from the nose, the coughing of measles are absent in small-pox. The excessive pain in the back, the vomiting, the severe chill, the high fever of small-pox do not occur in measles. The rash of measles consists solely of pimples, but in small-pox the hard pimples are converted into water-

blisters, and these, in turn, become filled with matter. The fever of measles is not very high, but increases rapidly a few hours before the eruption begins, whereas in small-pox the high fever of the first few days subsides with the development of the eruption. When the rash of small-pox is in its water-blister stage, it resembles that of chicken-pox. The blisters of chicken-pox, however, never become filled with matter, but come out upon the second day, and seldom occur upon the face. Chicken-pox is a very mild affection, but small-pox is a severe disease.

In most cases there can scarcely be any difficulty in distinguishing scarlet fever from small-pox. The eruption of scarlet fever, although accompanied by a slight roughness of the skin, is not elevated above the surface. It occurs in the form of bright red patches. A mistake might occur only in the presence of a malignant case. The constitutional symptoms are similar in both diseases—high fever, prostration, delirium, stupor, and haemorrhages. The likeness is heightened by the fact that in malignant small-pox a red rash comes out upon the skin during the first day or two, before the appearance of its characteristic eruption. This red rash resembles that of scarlatina, inasmuch as it is not raised above the surface of the skin. It differs, however, from the other, in being less diffuse and more irregular in its development. Doubt is at once set at rest by the speedy occurrence of the characteristic eruption of small-pox.

Malignant small-pox and malignant measles may be confounded prior to the appearance in small-pox of blisters and suppuration. In both diseases the eruption is of pimples; in both the fever is high, prostration great; and in both haemorrhages, delirium and stupor occur. The intense backache with which small-pox begins, and the severe cough of measles, are symptoms which should aid in the formation of an opinion as to the disease with which we are dealing. In the malignant varieties of measles, scarlet fever, and small pox, the system of the patient may be overwhelmed and death occur before the appearance of the rash. The knowledge of the prevalence of a certain epi-

demic is a guide in diagnosing these diseases. The skill of the physician, however, is indispensable to making a certainty of the conclusion to be reached.

For the treatment of small-pox the patient must, in the first place, be strictly isolated. The sick-room should be as large as possible, thoroughly well-ventilated and kept at a temperature of sixty-five to seventy degrees, Fahrenheit. Sunlight should be excluded, because it favors the pitting from the eruption. The patient should be as well nourished as is possible, despite the sickness of stomach, which is marked in the early stage of the disease and at the beginning of that of suppuration. Beef-juice, animal-broths, soups, eggs, milk, milk-toast, oysters, may be given at different times so as to avoid sameness of diet. Lemonade is useful for allaying thirst, and will sometimes check nausea. Ice-water and cracked ice moderate the inflammation of the throat. If gargles can be used, they are of service. If not, the throat can be cleansed and its soreness relieved by mopping the surface from time to time or by application of a spray. The chlorate of potash, ten grains to the ounce of water, constitutes a good gargle. The tincture of myrrh and the compound tincture of cinchona bark, properly diluted with water, are also serviceable.

At the onset of the disease it is well to have the bowels well opened by means of citrate of magnesia, Rochelle salts, or some other efficient purgative. Frequent spraying of the face with cold water is of service. Alcohol or spirits of camphor may be advantageously added to the water. The pain in the back may be relieved by the usual rubber hot-water bag. Fever is reduced by sweet spirits of nitre and neutral mixture, together with more powerful remedies in grave cases. If there is much nervous excitability, restlessness, or delirium, a dose of bromide of potash or of chloral hydrate may be given with the fever mixture. The dose of bromide of potash for an adult is twenty to thirty grains, and that of chloral hydrate, ten grains. Sometimes a dose of Dover's powder (ten grains) has a better effect.

If bronchitis develops it may be checked by the use of a mixture thus composed: —

Tincture of red pepper	32 drops.
Tincture of sanguinaria	3 drachms.
Syrup of squills	5 drachms.
Water enough to make	4 ounces.

Mix. The dose for an adult is a teaspoonful in a wineglassful of water every second or third hour.

During the secondary fever of the disease it is necessary to give, in addition to whatever fever mixture is used, thirty drops of the tincture of the chloride of iron in a wineglassful of water, four times a day, and two or three grains of quinine at the same time. Alcoholic stimulants, also, are needed at this period, particularly in confluent small-pox.

A very important feature of treatment relates to the eruption. The less the suppuration, the less scarring will be left upon recovery. Something can be done by the exclusion of light, and it is probable that some of the measures adopted largely owe whatever success they achieve to protecting the surface from the influence of light. Those parts of the body which are covered are never so much pitted as those which are exposed. A favorite way with some physicians to make the application for shielding the parts from light is to have a mask made, fitting the face, leaving openings for the eyes, nose, and mouth. Upon the under surface of the mask is spread mercurial ointment stiffened with arrow-root, in the proportion of an ounce of the former to a drachm of the latter. Instead of this ointment, mercurial plaster or sulphur ointment may be applied in the same manner. Tincture of iodine painted on the pimples is a good application. Ten grains to a half a drachm of corrosive sublimate dissolved in an ounce of glycerine and rubbed on the face with a pledget of raw cotton lessens the inflammation and the chance of disfigurement. Another preparation which may be used consists of five parts of carbolic acid, forty parts of olive-oil, and sixty parts of precipitated chalk. A paste composed of three per cent. of carbolic or salicylic acid, made up with starch or oil of sweet

almonds, has been used with favorable results for treating the mask. Lotions or baths containing boric acid are beneficial.

The eyes should be carefully watched. The matter should be kept washed away from them by a solution of boric acid containing ten grains to the ounce of water. If little ulcers form upon the eyeball they must be carefully cauterized by a surgeon. When the fever is very high and the patient very restless the use of ice-bags on the head and chest or the bath of immersion, gradually cooled, is beneficial. During the stage of suppuration in the confluent form of the disease the patient is much benefited by being placed in a moderately warm bath. The matter is washed away and the danger of blood-poisoning is diminished.

Malignant small-pox is a disease so violent and fatal that the most powerful stimulant remedies are indicated for its treatment. The disease needs the most careful and enlightened medical supervision.

Varioloid does not need much medical treatment. The citrate of magnesia or Rochelle salts at the beginning, some sweet spirits of nitre while the fever lasts, and some iron after the disease is well developed, will generally prove sufficient.

In every case of small-pox all the discharges should be disinfected. Bed-clothes and wearing apparel must be disinfected or, wherever possible, destroyed. The scales that fall should be burned. After the patient has entirely recovered the room should be disinfected by burning sulphur in it, after which it should be thoroughly ventilated by throwing wide open all its windows. The best agent, however, for disinfecting, is formaldehyde.

VACCINATION.

Fortunately there is possessed in vaccination a very simple safeguard against small-pox. Immunity from small-pox, through one vaccination, is not always permanent. The operation needs, as a precautionary measure, to be repeated at certain intervals. Children should be vaccinated within six months after

birth, and the operation should be repeated about the eighth and fifteenth years of age. If the vaccine virus takes on each occasion, life-long immunity from small-pox is generally conferred. Not infrequently even the first vaccination protects for life. It is prudent, however, to be vaccinated when small-pox becomes epidemic, if previous revaccinations have failed to take. The value of vaccination is incontestable. It is proved by abundance of trustworthy statistics. Epidemics of small-pox are by no means so common or so destructive now as they were before the discovery of vaccination by Dr. Jenner.

In order to be esteemed truly successful, vaccination must run a typical course. It is not enough merely to cause a sore arm. A good deal of inflammation may follow the operation and yet the result prove entirely abortive. The true appearance of successful vaccination is the coming, three or four days after the operation, of a hard, red pimple. This enlarges, and at the end of the second day it is transformed into a water-blister surrounded by a red zone of skin. Three days after the coming of the water-blisters, they become filled with matter instead of water. Two days subsequently to this the vaccination has reached its highest development. The zone of redness around the eruption begins to fade, a brown spot appears on the point, the contents dry up, a mahogany-colored scab is completed upon the fourteenth or sixteenth day after the operation. Healing having gone on below the scab, it detaches itself about the twenty-first or the twenty-third day. This leaves a round, depressed, and pinkish scar, which gradually becomes whiter than the surrounding skin, and generally lasts for life. This is the typical course of successful vaccination. During its continuance, some fever, headache, and restlessness may occur, especially in the case of infants, and the glands of the armpit may become swollen and painful. Occasionally, also, a red rash appears over the whole body. But these symptoms generally last only for a few days.

CHICKEN-POX.

Chicken-pox is a mild, contagious disease, attended with some fever and a general eruption. It is a disease confined almost wholly to young children, and is seldom seen after their tenth year. The rash appears after a fever of twenty-four to thirty-six hours duration. The fever is so slight, however, and so free from other constitutional symptoms, that the appearance of the rash is the first thing to call attention to the attack. Sometimes there are headache and restlessness. The eruption comes out first upon the breast and abdomen, and soon spreads to the upper and lower limbs. The rash occasionally attacks the forehead, scalp, and neck, but is not often seen upon the lower part of the face. It is in the form of small blisters and they sometimes appear upon the eye and invade the mouth.

The eruption of chicken-pox is fully developed upon the second day, and upon the third day it begins to dry up into little brown or yellowish crusts which, in the course of two or three days, loosen and fall off. A little scar is left in the places where the scabs fall off, but they generally become obliterated; only in rare cases do a few marks of chicken-pox remain permanently.

Chicken-pox is an insignificant disease. The chief medical interest in it consists in differentiating its symptoms from those of measles and small-pox, especially from small-pox. The difference becomes of special value when both small-pox and chicken-pox are simultaneously epidemic in a community. The severe symptoms of small-pox will, however, in a vast majority of cases, mark it as present, and not chicken-pox.

There may sometimes be some difficulty in distinguishing between varioloid and chicken-pox in a child. The eruption of varioloid, however, does not appear until the third or fourth day. It occurs first in the form of pimples, which subsequently become filled with water and afterwards with matter. It is only in the watery stage that there ought to be any possibility of confounding the two maladies, because the blisters of vario-

loid are generally, whereas those of chicken-pox are seldom, what is medically known as umbilicated—that is, dented on top. The eruption of chicken-pox appears from twenty-four to thirty-six hours after the attack of the disease, instead of four days afterwards, as is the case of varioloid. It comes so soon that it is, as already mentioned, the first symptom noticed. Little or no medical treatment is needed in chicken-pox. If there are headache, restlessness, and fever, a laxative may be given, together with some sweet spirits of nitre, and perhaps some bromide of potash. The child attacked should be given a light diet and be kept in the house.

CHAPTER XVIII.

THE HAIR, ITS FASHIONS AND ITS DISEASES.

AMONG the Greeks it appears to have been the custom to preserve unshorn during life a lock of the hair dedicated to the gods. Proserpine, the wife of Pluto, the god of the infernal regions, was believed, upon the approach of the death of a human being, to cut off this lock. When a Greek died a lock was cut from his hair and placed outside of the door of the house of the deceased, to indicate death within. Virgil, in describing the death of Dido, tells that Iris, the messenger of the gods, appeared, and referring to the sacred lock of Dido's hair, said: "This lock I, as commanded, bear away sacred to Pluto." In Thibet the priest is called in to cut hair from the heads of the dying in order that their souls may placidly depart through the top of the head.

The races possessing luxuriant hair have always highly esteemed it as an adornment lending importance and dignity to the person. The hair of the head and of the beard has often been associated with religious rites. The ancient Hebrews regarded shaving as indicative of shame or affliction, and, in predicting the desolation of Moab, the prophets Isaiah and Jeremiah declared that "every head shall be bald and every beard clipped." Tradition taught that Adam was created with a beard, and this growth became among the Jews one of the marks of their faith. They regarded a rude touch of the beard as a great personal indignity. It was allowed only to children and near relatives to touch the beard lovingly, and raising the hands reverentially to the beard was the sign of seeking hospitality. This sentiment for the beard has been shared by the Mohammedans, whose prophet, Mohammed, never suffered his beard to be touched with the razor. The Arabs look with abhorrence upon a bald head, and conclude their solemn oaths with the words:

"If I have done it, then may the Lord turn my locks into a bald head." In Babylon, Assyria, and Persia, the beard was held in high honor. The priests of Nineveh wore long beards, elaborately curled and oiled. The Persian kings had their beards plaited and tied with strands of golden thread. Among the Greeks the beard was generally worn until Alexander the Great, having conquered them, ordered its discontinuance, finding that its presence gave great advantage to an enemy in a hand-to-hand conflict. The Romans, until 290 B. C., allowed both hair and beard to grow long. From that time until the reign of Hadrian, A. D. 117, the Romans wore hair and beard short. They afterwards wore the beard long until the decline of the Roman Empire. How the beard was regarded by the ancient Romans we learn from Livy's vivid description of the scene when Rome was captured by the Gauls, who, entering the Senate chamber, and amazed at the sight of that dignified body sitting imperturbably in their curule chairs, were at first awed, when one of them, recovering, had the hardihood to stroke a Senator's beard, and was thereupon knocked down by the ivory staff which the Senator held as one of the insignia of his office. Then the Senators were massacred to a man.

Races characterized in the male sex by a sparse growth of hair upon the face are given to removing the appendage, which, in their case, is certainly not ornamental. The North American Indians were always careful to pluck out their scanty growth of beard. The ancient Egyptians universally practiced shaving, and according to Wilkinson, whenever, as he says, they "intended to convey the idea of a man of low condition, or a slovenly person, the artists represented him with a beard. They did not, however, despise it as a mark of manhood, as on certain festivals they assumed false beards, and their male deities were represented as bearded. As a sign of mourning they allowed the beard to grow."

The belief that abundance of hair, especially on the body, is indicative of great strength has survived to the present day.

This belief, in Christian communities, may have originated from the history of Samson. He said to Delilah: "If I be shaven, then my strength will go from me, and I shall become weak and be like any other man." When he was despoiled by Delilah of the "seven locks of his head," captured, and blinded, he had to wait until his hair grew again before he was able to pull down the pillars of the temple in which the multitude was assembled.

The ancient Germans allowed the hair to grow very long, and according to the historian Tacitus, so kept it during old age. One of the mediæval emperors of Germany, Frederick I, was surnamed Barbarossa on account of his having a red beard. There have been, in both ancient and modern times, great fluctuations in the fashion of wearing the hair. The greater abundance and length of the hair of the head among women has admitted among them the most varied arrangements of the growth. In the Merovingian line of early French kings, long hair was the sign of princely birth and breeding. The flaxen locks of those people were arranged with great care, and flowed over neck and shoulders. Their subjects were compelled to shave the back part of the head, to comb the hair over the forehead, and to content themselves with the ornament of two small whiskers. So the historian Gibbon says, in his "Decline and Fall of the Roman Empire." From the thirteenth century monuments we gain an idea of the way in which the hair was worn during that period. The widow of Richard I and Eleanor of Castile are represented with waving hair flowing from beneath their crowns. Towards the close of the century, the ladies' hair was arranged within a network of gold and silver filigree or of silk network. In an effigy of Elizabeth, the wife of Henry VII, at the beginning of the sixteenth century, an angular head-dress was worn, from which the hair fell unconfined upon the shoulders. During the reign of Charles II, of England, the ringlets of the ladies fell from a circlet of pearls. Under William III, head-dresses succeeded to flowing ringlets. In the latter part of the eighteenth century a very extravagant style came into fashion. The hair

was frizzed up into curls, drawn up high like a military shako, adorned with ribbons, feathers, and jewels, and stiffened with pomatum and powder. The time demanded for the production of these elaborate coiffures was so great and the call upon hair-dressers so insistent that it was frequently necessary for ladies to have their hair dressed a day or two in advance of the festivity in which they were to take part. This, in turn, often involved the necessity of their sleeping propped up in a chair until the event took place.

Men have, at various periods, worn their hair closely cut, or have allowed it to attain its natural length. During the civil war in England between the adherents of Charles I and those of Parliament, the cavaliers of King Charles's party wore their hair flowing, in what the closely-cropped members of the other party contemptuously called "lovelocks." Wigs have been from time immemorial used by both sexes for the purpose of concealing baldness. At certain periods, too, they have also been fashionable as an adornment. When used to conceal baldness, they are made to imitate the natural growth of hair. When employed merely as part of ceremonial attire they have assumed huge and unnatural proportions. The British Museum contains an Egyptian wig which is supposed to be about four thousand years old. Wigs were known to the Greeks and the Romans, and presumably to the Assyrians. The modern large wig, the peruke, worn as an article of dress, was introduced by Louis XIII of France, in order to conceal his baldness. It became generally adopted as a portion of full-dress and maintained its position for a century. There was a time when Louis XIV, the successor of Louis XIII, objected to a certain high style of dressing the hair among the ladies of his court, but the peruke for gentlemen outlasted his reign. The fashion gradually declined, and the only remnant of it now lingers with English judges, barristers, and the speaker of the House of Commons, and with those only when in performance of their public functions.

Powdering the hair was a widespread fashion during the

eighteenth century. The powder was made of starch, scented with violet or some other perfume. Laws were enacted forbidding the use for the hair of any other powder but starch. In order to keep the powder in place the hair was first of all pomatumed. In 1795 a tax was imposed in Great Britain upon hair-powder, and for some time considerable revenue was derived from this source. Eventually, however, it had the effect of causing the disuse of hair-powder.

The style of wearing the hair upon the face has greatly varied in modern times. At certain periods the mustache and imperial were in vogue. In the time of Charles I of England, the Van Dyke, the pointed beard, was the prevailing fashion. In European countries generally the style was set by the reigning monarchs. Beards were highly esteemed by Spaniards until the accession of Philip V to the throne. The circumstance of his having a scanty growth of beard obliged the king to shave, and in consequence the courtiers and people generally imitated his practice. Beards were retained by the French, under Francis I, long after they were out of fashion in other countries, because the king wore a long beard for the purpose of concealing a scar upon the chin. The beard was so highly valued by Juan de Castro, the Portugese admiral, that when he extorted a *loan* from the city of Goa, he presented that municipality with some of his whiskers, with the remark: "All the gold in the world cannot equal this natural ornament of my valor." Beards sometimes attain immense size. That of Johan Mayo, a German painter, was so long that it trailed upon the ground when he stood, and for convenience he was accustomed to tuck it into his girdle. It is told of a certain emissary from England to Russia, in 1555, that his beard was broad, thick, yellow, and measured five feet two inches in length.

The strange practice of taxing beards occurred both in England and Russia. Men who wished to wear beards were obliged to pay for the privilege under several of the earlier English monarchs, and long afterwards under the Czar Peter, of Russia.

Professional care of the hair and beard early led to the existence of the barber, to whom great loquacity has always been ascribed. Countless references to this trait are met with in literature. We see it in George Eliot's "Romola." The village barber was one of the familiars of Don Quixote before he set out on his knight-errantry. The barber of Louis XI, of France, is signalized in history. The occupation of the barber was for centuries combined with that of minor surgery. In the early times, however, such duties did not rise much above the dignity of a handicraft; the barber-surgeons did not stand upon the same plane as that occupied by physicians and surgeons. It was not until 1745 that, in England, the barber ceased to be a barber-surgeon and became a barber pure and simple. Nevertheless, the progress of surgery had been promoted by some of these men. Ambrose Paré, who lived in the sixteenth century, was the most illustrious surgeon of his times, and did much to improve the art of surgery. Yet he began his career as a barber-surgeon, and in the zenith of his fame became surgeon-in-chief to the armies of France. The world of that day owed to him a debt of gratitude for one thing alone. He abolished the barbarous practice of applying boiling oil to wounds for the purpose of inducing haemorrhage in them. It was he also who introduced the practice of using ligatures for divided blood-vessels, a procedure which adds to the efficiency and safety of extensive operations. For many years thereafter the barber, no longer the surgeon-barber, plied his trade of snipping hair and beard and making mild suggestions to his customers about the efficacy of his tonic and shampoo, incidentally acquiring his reputation as an inveterate talker about all manner of things within and beyond his ken. His white pole of a sign, wound around with a diagonal red band of paint, is supposed to be the survival of his old trade as barber-surgeon, representing the arm of the patient so wound preparatory to being bled, or blooded, as it was often called. Any keen observer must perceive that the barber's present representatives do not generally deserve the

reputation of talkativeness which they once acquired. The modern barber reads and has learned of the fun that was poked at him, has now become comparatively silent, and strictly attends to business, although long habit still compels him to whisper, "Tonic, shampoo, your hair is getting rather thin on top."

The health of the hair, and consequently its beauty, may be affected by various constitutional diseases, by the condition of the scalp, and by nervous and emotional influences. It may also be affected by parasitic invasion. The commonest consequences of these ailments are grayness and baldness. On the contrary, there may be excessive growth of hair upon various portions of the body.

BALDNESS.

Loss of hair may be partial or general. It may be premature, incidental to old age, or it may be absent from birth. Tendency to early baldness is hereditary. The nourishment of the hair is dependent upon abundant supply of blood to the scalp, its steady nervous support, and absence of constitutional or acquired disease.

Intelligent treatment of the hair should begin in infancy. Indigestion in children generates tetter, scrofula, and parasitic diseases, with which healthy growth of hair is incompatible. Baldness is more common among brain-workers than among artisans. The sedentary habit of the student is favorable to the acquisition of dyspepsia and feeble circulation. Preponderance of blood drawn to the brain in intellectual work is at the expense of that necessary for the nutrition of the scalp. The nervous system, also, exercises a powerful influence upon the growth of the hair. When the scalp's nutrition has been long inadequate, the scalp loses its sensibility, becomes white and shiny, and permanent loss of hair upon it ensues. Loss of sleep, anxiety, grief, excitement, alternate exaltation and depression of spirits, abuse of tobacco and alcoholic liquors, are among many causes which impair nervous force.

Loss of hair is occasioned by certain diseases of the scalp, by typhoid and spotted fevers, scarlet fever, erysipelas, and other diseases. Even in anaemia and general debility, the nutrition of the hair is lessened. Unwise habits among women in dressing the hair dispose to its loss. Hair needs ventilation, sun, and air just as more highly organized tissues do. These beneficial influences are often lost even by men, through the practice of some of them in constantly wearing the hat. The best hats are those which are furnished with minute perforations. A sparing use of some fragrant oil on the scalp and hair is conducive to its health and preservation, supplying the scalp's deficient *sebum*, the natural oil of the skin, and preventing splitting and ragged condition of the ends of the hair. The scalp and beard should be washed once or twice a week with soap and warm water. After a surf-bath the hair should be loosened and thoroughly dried, if possible in the sunlight.

A good preparation for cleansing the hair can be made by the following formula:—

Borax	1 ounce.
Bicarbonate of soda	½ ounce.
Camphor	1 drachm.
Glycerine	½ ounce.
Rose-water	1 quart.
Alcohol	2 ounces.

Mix. Dissolve the camphor in the alcohol and add to the other ingredients previously mixed.

A drying wash for moist hair is made by the following formula:—

Cologne or lavender water.....	4 ounces.
Borax	½ ounce.
Tincture of cochineal	½ ounce.
Rose-water	3 ounces.

Mix.

Brillantine pomatum can be made by melting together in a water-bath six ounces of suet and four ounces of clear amber resin. While at the temperature of about one hundred and seventy-six degrees Fahrenheit, add a solution of five ounces

of caustic soda in ten ounces of alcohol. Heat in a large vessel until a transparent soap is formed. In another vessel heat eight pounds of vaseline in ten pounds of castor-oil, and add gradually, by portions, twenty ounces of the soap mass and three quarts of rectified spirits. Heat the whole product until bubbles rise, pour out, color with gamboge, and scent with three ounces of oil of sweet orange or any other perfume. For this recipe there is the high authority of "The Druggist and Chemist."

"The British and Colonial Druggist" gives the following formula for a stimulating pomatum:—

Lard	16 ounces.
Almond-oil	4 ounces.
Marrow	20 ounces.
Balsam of Peru	2 drachms.
Powdered cinchona	2 drachms.
Oil of cloves	2 drachms.
Otto of rose	20 drachms.

Mix.

It is only within comparatively a few years, say at most thirty, that women as well as men relinquished their former practice of using pomatum on the hair and resorted to wearing it dry and often frizzed. It would really seem that this rigid abstention from the use of pomatum has been followed in both sexes by an increase of baldness.

Combs should have large, coarse, and blunt teeth. The excessive use of the fine-tooth comb, with which, a generation or two ago, people frequently exacerbated their scalps, has happily ceased. Its occasional use is desirable, but it should never, as of old, be dug into the scalp, but be gently drawn over its surface. A moderately stiff brush may be used several times a day to free the scalp of dust and dandruff, and to gently stimulate its surface by friction. Bandoline has a tendency to change dark hair to that of a reddish cast. The following is a formula for making it:—

Gum-tragacanth	2 ounces.
Essential oil of almonds.....	2 drachms.
Alcohol	4 ounces.
Orange-flower water	1 pint.
Water	7 pints.

Mix.

Rose-water or otto of roses may be substituted for the perfume of the essential oil of almonds in the above formula. The mixture may be colored pink by the addition of liquid carmine. The gum is dissolved for a day or two in water, stirred well, the solution strained, and finally the alcohol, with the perfume, added.

Another formula for bandoline is the following:—

Quince seed .....	.....	.....	½ ounce.
Glycerine .....	.....	.....	1 ounce.
Rose-water .....	.....	.....	1 pint.
Mix.			

The following wash for the hair is given by "The Pharmaceutical Journal":—

Oil of sweet-almonds .....	.....	40 ounces.
Solution of borax .....	.....	10 ounces.
Solution of potash .....	.....	6 drachms.
Essence of lemon .....	.....	½ ounce.
Essence of bergamot .....	.....	2 drachms.

Put the oil of almonds in a bottle or other suitable vessel and add thereto the solution of borax. Shake well together, and add the solution of potash, and again shake after a thorough incorporation; lastly, add the essence of lemon and bergamot, and thoroughly mix. This will be found to produce an inseparable and uniform creamy preparation.

Dusting powders, especially so-called diamond and gold-dust powders, cut the hair and cause it to become dull, brittle, and lifeless. A hair-powder, the ingredients of which are at least harmless, is composed as follows:—

Finely powdered starch .....	.....	1 pound.
Orris-root .....	.....	1 ounce.
Oil of rhodium .....	.....	10 drops.

Mix.

For preparations of a brilliant dust for the hair, Christiani gives the following directions for so-called diamond-dust, gold-dust, and silver-dust:—

For diamond-dust, "white smalts (*smalts* is a glass formed by melting oxide of cobalt with pure quartz sand and carbonate of potassium) are well washed and rubbed into a coarse powder in an iron mortar, after which they are put into paper boxes holding about a quarter of an ounce."

GOLD-DUST.

"Florence leaf, such as is used in common gilding, is rubbed to a coarse powder in a Wedgwood mortar, and put into small paper boxes neatly labelled."

SILVER-DUST.

"White leaf, or Dutch metal, is rubbed in a mortar and finely divided, and put up in neat boxes holding about a drachm."

Baldness is much more common in men than in women, for several reasons. In women there is a thicker layer than in men, of connective tissue under the scalp. This involves with them, beyond men, a larger supply of blood-vessels there, with consequent nutrient substance from the blood. Women, too, pay much more attention to their hair than men do to theirs. Their usual mode of life exposes them less than men to various excesses which weaken the constitution.

Women are quick to detect the approach of baldness and skillful in concealing its encroachment. There is one thing upon which, however, they are not always upon their guard, owing to ignorance of a simple physical fact. Each hair-bed is capable of supporting in a healthy condition a hair-shaft of a certain length, no longer. The case is exactly like that of a plant in its dependence upon the soil. Whether or not women are attempting a growth of hair beyond the capacity of the soil of their heads to maintain it is easily discoverable by examination of the ends of the hair. If these are dry, brittle, and split, the ends should be cut off down to the point in the shafts where the healthiness of the growth is evident. Suppose that there comes a period by age, or by some temporary ailment, when the hair is dropping out; manifestly the soil of the hair-beds, whatever it once may have been capable of, is no longer equal to supporting the length of hair which formerly was habitual, and the remedy is the obvious one just mentioned. Cutting the hair close merely increases the thickness of the shafts at the expense

of length. A man's beard is by nature silky, but if he shaves continually the growth becomes coarse. Just so it is with any growth of hair, whether on the head or face. To each individual nature allots a normal length, which is determined by the richness of the soil of connective tissue, and can only be modified by cutting.

After typhoid and other severe fevers the hair loses its vitality, its lustre, and has a dull, dead appearance, and eventually falls out. It is then advisable to shave the scalp, keeping the head covered with a light cap until a new crop of hair has appeared. The tone of the scalp may, in the mean time, be improved by appropriate local and constitutional treatment. If the toilet of the hair were generally performed with more intelligence than it is, early baldness would be much less frequent than it is now.

DRY SHAMPOO.

A crude species of massage is practiced by barbers and hair-dressers under the name of "dry shampoo." This treatment is, nevertheless, of service in maintaining the scalp and hair in healthy condition. It is performed by manipulating the scalp with the finger-tips, drawing it up between the thumb and fingers, and moving it backward and forward and from side to side upon the skull. Then the scalp is washed with a slightly stimulating liquid, as, for instance, equal parts of bay-rum and water, with a little ammonia solution.

WET SHAMPOO.

If not too frequently repeated, washing the scalp with soap and water is of use for removing the accumulation of scales of dandruff adhering to the scalp and entangled in the hair. These scales, in profusion, may by their presence impair the nutrition of the hair. Once in two weeks is generally sufficient for this kind of cleansing operation. Take soapy matter, either previously manufactured in liquid form or else made extemporaneously from some pure, bland soap, and let it be rubbed into foam upon the

head. The entire scalp should be thoroughly gone over with the tips of the fingers and the lather then removed by a douche of warm water over the head while it is held over a basin. The hair ought then to be dried by hot towels. As a finality, some pure animal oil should be rubbed into the scalp with the tips of the fingers. The hair itself will incidentally receive sufficient oiliness. This use of a good oil or pomatum is important, as supplying the natural oil of the scalp and hair, lost by the operation of applying soap to them.

ACUTE AND CHRONIC BALDNESS.

Premature baldness is correctly divisible into two varieties, acute and chronic. Each of these forms may depend upon the operation of either general or local causes. In the acute variety the hair may be lost within a few days or in the course of three or four months. In some cases the scalp seems entirely free from diseases, but the hair falls spontaneously, or under the movement of the brush. Sometimes neuralgic pains precede loss of hair, but in many cases no sensation whatever is experienced. The hair-shafts themselves may not be changed in appearance. The first manifestation of chronic baldness is the loosening and dropping out of the hair when it has attained its usual length, and the supplying of its place by a shorter growth. After this change has been proceeding for a while the second stage presents diminution in the thickness as well as in the length of the individual hairs, and they become weaker and weaker in vitality, until at last they form a mere down. Finally, even this feeble growth may fail. The third stage is reached when the hair has entirely disappeared, when the upper layer of the skin of the scalp becomes thin and shrunken and the bald pate presents a tense, glistening appearance, as smooth and shiny as a billiard ball. The process usually begins at the crown of the head and extends forward to the forehead, but sometimes it begins just above the forehead.

Various disorders of the scalp cause loss of hair. One of the

most frequent causes of early baldness is an oily, scurfy skin. This affection, as previously described, is characterized by the production on the head of exudation mixed with scales of the scarf-skin, forming crusts of a dirty white or yellowish tinge. These crusts obstruct the openings of the ducts on the scalp. The course of the affection is slow. This form of it may occur in youth, or may be postponed until between the thirtieth and fortieth years of age.

Baldness and scales on the scalp are, of course, consequent upon defective nutrition of the scalp. Excluding the effect of serious diseases, such as consumption and cancer, they generally arise from imperfection of the digestion and the blood-forming system. Including the effect of serious diseases, they may follow some attacks of severe fever, or are owing to some obscure local conditions which have impaired the nutrition of the scalp. Among the latter may be cited heat and cold, uncleanliness, use of hair-powder, dyes, irritating lotions, and too severe combing and brushing.

Tetter of the scalp, whether acute or chronic, seldom gives rise to permanent baldness. In rare cases, however, tetter produces an abscess in the scalp, and the hair becomes thereby irretrievably lost over the area in which matter has appeared. Some of the parasitic diseases of the scalp cause loss of hair in spots. This is not, however, usual, but occurs only under exceptional circumstances. Herpes, a disease which produces groups of blisters, is among the diseases which attack the scalp, and may produce more or less loss of its hair.

In an effort to arrest the falling out of the hair and to restore it to a healthy growth, it is not sufficient to adopt only external applications for treatment. The cause of the affection must be sought, and, if found, some internal, constitutional remedies should be administered. The scalp should be kept scrupulously clean, without exacerbating it by harsh treatment. If the hair does not seem altered in appearance, the application of some mildly stimulating astringent, cleansing lotion is of

advantage. A pleasant and excellent one is the balsam of Peru, which may either be dissolved in diluted alcohol or mixed with some fatty substance and used as a pomatum. It may be incorporated with lanolin, which is not only oily, but a nutriment for the hair and scalp. Three parts of pure lanolin to one part of benzoated lard makes a mixture of the proper consistency. The tincture or the compound tincture of benzoin may be used instead of the Peruvian balsam. The sulphate of quinine, also, a drachm to an ounce of lard, perfumed with a few drops of some essential oil, makes a very good preparation. An ointment containing a drachm of beta-naphthol to the ounce of lard or of lanolin makes an excellent application. Resorcin may be made into an ointment of the strength of five or ten grains to the ounce of lanolin or of lard. A good emulsion for a lotion may be made by adding olive oil or sweet almond oil to an alcoholic solution of resorcin. A remedy frequently of service for the condition here discussed is a solution of chloral in diluted alcohol or in cologne, in the proportion of one drachm to half a pint. Glycerine may be substituted for the alcohol or cologne. A good preparation is made by mixing equal parts of white precipitate ointment and cold cream, or of oxide of zinc ointment. An occasional shampoo with the tincture of green soap, either of full strength or weakened, would be of assistance to the other procedures recommended. This process cleanses and stimulates the scalp, and may be employed every day if it does not prove too irritant. It is important that after the treatment is finished all the soapy matter should be washed away with salt water, and the hair well dried. After that any one of the ointments or of the lotions here described should be applied.

When the oil-glands of the scalp are diseased, constant care and patience are indispensable to averting loss of hair. As a general rule, both internal and external treatments are demanded. The earlier suitable measures are taken, the better is the prospect of success. The patient should have the benefit of sunlight and exercise, and the diet should be carefully regulated. Sulphur is

a valuable constitutional remedy in this complaint. Sulphur is an element naturally occurring in some abundance in the hair, and therefore is instrumental towards its nutrition. To be of effect when an oily, scaly condition of the scalp is present, it should be persistently taken in five-grain doses three times a day, during a considerable time.

It is not necessary to sacrifice the hair by cutting. It opposes no obstacle to carrying out the treatment prescribed. The first thing to be done is to remove the crusts on the scalp. This can be easily done by saturating them with oil. A cap can be worn until the oil has had time thoroughly to soak into the foreign matter encrusting the head. Any pure oil will accomplish the purpose, but the best of all for it is the oil of ergot, which, as oil, not only detaches the crusts, but has a medicative influence upon the seat of the disease. An excellent preparation can be made by mixing one part of the oil of ergot with four parts of olive-oil. A small amount of the oil of eucalyptus forms a very efficient combination with it. A mixture of the oil of ergot with an equal quantity of glycerine, or the fifty per cent. solution of boroglyceride is a good preparation. Of course the addition of a few drops of perfume would increase its pleasantness.

After the crusts have been removed from the scalp, it may present a healthy appearance, or it may be unusually pale or red. In case it be pale, applications that are more or less stimulant are indicated; but in case it be red, only the most bland application should be employed. In mild cases the use of the oil of ergot, together with occasional cleansing of the head with soap and water, may be all that is needed to restore the scalp to a healthy condition. In severe cases, however, more particular measures become necessary. By the cleansing, the disease remains unaffected; the waste products of the disease mixed with scales, forming crusts, again appear upon the surface of the scalp. In this case, following the procedure already described for removing the crusts, the scalp should be well

cleansed with soda-soap and water, with which chamomile or sulphur is advantageously blended, or instead of soap and water a mixture of yolk of egg and lime-water may be beneficially employed. The surface of the scalp having been well cleansed, the next treatment is its stimulation. The degree of this must depend upon the character of the affection. It is safer, of course, to essay first the effect of mild stimulation. A solution of table-salt and water, of the strength of a fourth to three-fourths of a pound of salt to the pint of water, is convenient and often effective. Five to fifteen grains of the carbonate of potash to the ounce of water may give good results. Equal parts of glycerine and water are occasionally of benefit. A drachm of carbolic acid to the pint of water is capable of exciting circulation in the scalp. An ointment of Peruvian balsam can be recommended. The fluid extract of witch-hazel may be used. Naphthol and resorcin are valuable agents. Two to five grains of corrosive sublimate to the ounce of water, or mixed with an ounce of lard, is a good application. Glycerine, alcohol, or cologne may be substituted for plain water indicated above. An ointment of tar, or a solution of tar in alcohol, is sometimes of benefit. An ointment containing precipitated sulphur often yields good results. Ten grains of tannic acid in solution, to the ounce of glycerine; an ointment of tannic or of gallic acid will often be of service. An ointment composed of two parts of salicylic acid to three parts of the tincture of benzoin and one hundred parts of neatsfoot oil may be used with some confidence. Jaborandi has a good effect upon the growth of the hair. Half a drachm of the tincture of jaborandi added to equal parts of glycerine and lanolin is a good stimulant to the glands of the scalp, a small amount of the preparation being rubbed on the scalp every night. Alcohol and preparations into which it enters,—various spirits, ether, the essential oils, petroleum, turpentine, and solution of ammonia,—are frequently beneficial when decided stimulation is demanded. White precipitate ointment, either in full strength or weakened, is likewise useful. A good stimulant is chloral

hydrate, in the form of a lotion made by dissolving a drachm in six ounces of alcohol or of cologne and two ounces of glycerine.

If early baldness is caused by depression, exhaustion, or any other disorder of the nervous system, remedies must be given to restore the tone of that important agent of the body's economy. Change of climate is desirable, sojourn at the seaside, with bathing, or a trip among the mountains. Drugs of a tonic sort are required,—iron, quinine, cod-liver oil, and others which have influence upon the nervous system.

The nutrition of the scalp is promoted by the treatment of massage, the use of hot, alternating with cold, douches of water, by shampooing with either hard or soft soap, and, above all, by galvanic electricity. The electrical current from the negative pole may be applied by means of moistened sponges, the hair being moistened to permit its easy passage, and parted at intervals so as to let the scalp and sponges come into contact with each other. Or, the hair having been first dampened, the negative pole of the galvanic battery may be attached to a special brush for the purpose, having wire bristles, which is used on the head with the right hand, while the positive pole, with its moistened sponge, is held in the other hand. Thus the current is sent searching through every portion of the hair and scalp.

Obstinate cases require, in addition to the means already described for combating this disease of the scalp, drugs of greater strength than those previously mentioned. The effects of these, however, need to be closely watched lest they produce inflammation of the scalp instead of relieving it of disease. When baldness has been caused by some constitutional disease, the appetite, digestion, and general health must be improved by careful attention to hygienic rules and by the use of tonics.

Some formulæ are here added for preparations useful for removing dandruff and stimulating the growth of the hair:—

Boric acid	1 drachm.
Salicylic acid	$\frac{1}{2}$ drachm.
Oil of anise	5 drops
Oil of rose	3 drops.
Lanolin	$\frac{1}{2}$ ounce.
Cold cream	$\frac{1}{2}$ ounce.

Mix. Rub well into the eyebrows, scalp, or any part of hairy surface where there is much dandruff.

Compound tincture of cinchona.....	1 ounce.
Compound tincture of benzoin.....	2 ounces.
Glycerine	1 ounce.
Cologne	2 ounces.
Water	2 ounces.

Mix.

Salol	$\frac{1}{2}$ drachm.
Tannic acid	1 drachm.
Balsam of Peru	$\frac{1}{2}$ ounce.
Lanolin	$\frac{1}{2}$ ounce.
Benzoated lard	1 drachm.

Mix.

Balsam of Peru	$\frac{1}{2}$ drachm.
Beta-naphthol	1 drachm.
Lanolin	6 drachms.
Benzoated lard	2 drachms.

Mix.

Carbonate of potash	1 drachm.
Water of ammonia	6 drachms.
Tincture of cantharides	2 drachms.
Oil of nutmeg	12 drops.
Cologne enough to make	$\frac{1}{2}$ pint.

Mix.

Spirits of ammonia	$\frac{1}{2}$ ounce.
Tincture of capsicum	$\frac{1}{2}$ ounce.
Spirits of lavender	1 ounce.
Tincture of nux vomica	$\frac{1}{2}$ ounce.
Camphor liniment	2 $\frac{1}{2}$ ounces.

Mix.

FOR BALDNESS.

Tincture of nux vomica	$\frac{1}{2}$ ounce.
Tincture of capsicum	$\frac{1}{2}$ ounce.
Brandy	4 ounces.

Mix.

Tincture of benzoin	2	drachms.
Spirits of chloroform	1	ounce.
Tincture of nux vomica.....	2	drachms.
Alcohol	2½	ounces.
Mix.		
Resorcin	½	drachm.
Glycerine	4	ounces.
Bay-rum	4	ounces.
Mix.		

CIRCUMSCRIBED BALDNESS.

In the affection of limited baldness the hair falls out in one or more patches. The loss may be sudden, but it may also be gradual. A single patch may suddenly appear, or several may develop in quick succession. This form of baldness may attack any hairy portion of the body, but it generally begins upon the scalp. The affection usually occurs in the case of persons who have previously possessed abundance of hair. The individual hairs fall out without breaking, and neighboring bare spots may coalesce to form patches of considerable size. The bare spots may, in fact, spread so widely as to form general baldness. As a general rule, however, the bare areas do not increase in size, and thus maintain their isolation. These areas of bare scalp are generally characterized by paleness of skin, and sometimes the skin also looks thin, smooth, and glossy. Usually the surfaces are entirely destitute of hair, but in some cases sparse, unhealthy hairs appear upon them. While the disease is in progress the hair around the bald area or areas is very loose, and falls out upon the slightest stress. If the disease be arrested these hairs become more firmly fixed in their follicles. The fall of the hair is not generally attended with any other perceived symptom of disease except, perhaps, itching, which sometimes precedes and sometimes accompanies the shedding of the hair. Very often the sensibility of the denuded part or parts is either diminished or entirely lost.

If curable, the duration of circumscribed baldness depends very much upon the age of the patient, and at any age upon the

condition of the system. At times the rapidity of recovery corresponds with that of the attack. In some cases months or even years pass before the growth of the hair is renewed, and in some cases, of course, baldness remains permanent. Circumscribed baldness is more disfiguring than general baldness. If the disease be arrested, the new hairs that sprout from the scalp are thin, light-colored, and downy. Gradually they become more numerous, thicker, and more colored, until at length the formerly bare patch or patches of the scalp are covered with a healthy growth.

Circumscribed baldness may be distinguished from ringworm of the scalp by the presence or absence of the nibbled, ragged appearance of the hairs in the ringworm affection. It occurs in both sexes and at all ages, not even children being exempt from it. It is often associated with a depressed condition or actual disease of the nervous system. It has been known to follow emotional shock, neuralgia, epilepsy, debilitating fever, or some other serious illness, such as epidemic influenza or the grippe. It is sometimes produced by an injury. In some cases it seems to be produced by a parasite. The disease has been known to spread from one person to another in schools, hospitals, and barracks.

In most cases of circumscribed baldness it is necessary to build up the system by means of a nutritious diet, fresh air, exercise, change of scene or climate, and tonic remedies. Galvanism, codliver-oil, iron, maltine, and the compound syrup of the hypophosphites are useful. The external treatment suitable is the same as that already described for premature general baldness. When the patches are pale and smooth, agents that are decidedly stimulative are required. The best preparation of this kind is an ointment containing mercurous oleate. This may be used pure, or else weakened with an equal quantity of lanolin. An ointment of beta-naphthol, containing from ten to sixty grains to the ounce of lard, may be frequently used with good result. Resorcin and thymol are also good applications. They may be combined as follows:—

Resorcin	.....	1 drachm.
Alcohol	.....	4 ounces.
Mix.		
Thymol	.....	½ drachm.
Castor-oil	.....	2 ounces.
Almond-oil	.....	2 ounces.
Mix.		

It is of advantage to shave the patches if they become covered with fine down. In the case of small patches which do not seem to be improved by mild applications, it is often of service to use cantharidal collodion. This is a solution of Spanish-fly and gun-cotton in ether. It is applied to the surface with a camel's-hair brush and the operation repeated every week or ten days. If the spots of baldness be large, such energetic treatment is not advisable. A lotion which has been used with advantage is the following:—

Chloride of ammonia	.....	20 grains.
Corrosive sublimate	.....	10 grains.
Distilled water of witch-hazel	.....	2 ounces.
Alcohol	.....	3 ounces.
Mix.		

A hot poultice, to which mustard is added, often produces a good effect when the patches are large.

A number of powerful drugs are used in rebellious cases of circumscribed baldness, but their properties should be thoroughly understood, and they should be prescribed and their effect watched by a physician. The treatment which has been outlined is generally successful with young patients. Among all patients much depends upon securing the general health. Not infrequently, when the general health is restored, the bald spots rapidly become covered with a healthy growth of hair.

GRAYNESS OF HAIR.

With advance beyond a certain age, the hair generally loses its original color, becoming at first gray and eventually white. Whereas this is the general law, the hair sometimes has strange

freaks. A case is recorded of a lady whose hair blanched in places during attacks of nervous headache, but resumed its original color upon the cessation of pain. Tendency to become gray in early life is not infrequently hereditary. In rare instances grayness of the hair is present from birth. The celebrated Timour, the Tartar, is reported to have been gray almost from the cradle; this phenomenon being regarded by his followers as indicative of precocious maturity. Lamartine, the French historian of Turkey, writes of him: "These white hairs on the cheeks of twenty set off the lustre of his complexion and impressed a strange but rather agreeable than ungraceful character upon his beauty."

Cases in grayness are met with in which a single tuft of white hair is inherited for generations. Sir Erasmus Wilson mentions a peculiar case of another kind. In this, the original color of the hair was brown. The loss of pigment in it was not continuous throughout each hair-shaft, but occurred in segments, so that segments of white and brown alternated, as in a porcupine's quills. Sir Erasmus Wilson mentions the case of a man who was so frightened, in anticipation of his expected execution, that the color of his hair changed to white; not uniformly, but with the white interspersed among hairs of the reddish cast which had been the natural color of his head of hair.

Cases sometimes occur where the hair of old persons which has long been white assumes a dark color. It is said that both Mary, Queen of Scots, and Marie Antoinette turned gray within a short time. It is even alleged that the hair of Sir Thomas More became gray during the night preceding his execution, and it is reported of a Sepoy prisoner that his hair turned white within half an hour.

Among the albinos the hair is generally soft and white. In all persons, when the pigment of the hair is slight, grayness is produced; but when pigment is entirely absent, the hair is necessarily white. Grayness may begin in the beard, but generally it first affects the hair at the temples. Gray hair, as every one

knows, generally denotes the flight of years, and, after middle age, is accepted by most persons with equanimity. But resignation should really have no place in the sentiment evoked, if the lines of the face betoken age for in that case the influence of gray hair in conjunction with them is softening. White in the hair has a rejuvenating effect even for youth. When powdering the hair was fashionable, even the youthful looked still more youthful; the tint of the complexion was enhanced, and the whole expression beautified.

A tendency to grayness can sometimes be arrested by the administration of remedies which remove the cause upon which change of color depends. If, however, that fails, and one be dissatisfied with the processes of nature, coloring the hair must be resorted to. The preparations usually employed are either of vegetable or mineral composition. The vegetable kind are generally less harmful than the others, while the effect of the mineral kind is more permanent. The oil of black walnuts, oil of mace, oil of chamomile, and oil of colocynth are all used for darkening the hair. Frequently washing the hair with a tea made from sage also darkens it. Tannic acid or gallic acid, in the proportion of sixty grains of the acid to the ounce of glycerine, oil, or lard, will communicate a dark color.

Skill is needed in the application of hair-dyes. As a preliminary the hair is washed with soap and water and a solution of soda or spirits of ammonia with water. After being well dried, the coloring matter is applied. The most efficient vegetable dye is a combination of the powder of dry henna with the powder of the indigo plant. The two powders are mixed separately with water, so as to form a thick paste. The henna paste is first applied, and in about an hour turns the hair to a red color. The indigo paste is then applied, and after several hours the hair is washed with water, when it is found to be stained a deep black. The formula for a vegetable dye that has been much used is the following:—

Green black-walnut hulls	4 ounces.
Claret	8 ounces.
Mix.	

The most active mineral dye is the nitrate of silver, used either in solution or in the form of an ointment. The solution is made of various strengths, from fifteen grains to the ounce of water, to sixty grains to the ounce of water. After the hair has been washed in the manner previously described, the operator, holding a large comb in the left hand, raises the hair in places and applies the dye with a soft tooth-brush held in the right hand, the brush being gently moved up and down to insure that the dye is well applied towards the roots of the hair. Rapid fanning hastens the drying of the solution. If a drop of the dye should fall upon the skin it can be removed by immediately sponging the spot with a solution of common table-salt and water. The process requires from two to three hours and needs repeating every month or two. The tint is deep black.

Light shades of coloring for the hair are produced by the application of rhubarb or of turmeric. The most efficient bleaching agent is the peroxide of hydrogen or hydrogen dioxide. The following is a hair-bleaching mixture:—

Muriatic acid	2 ounces.
Water of ammonia	1 pint.
Rose-water	2 ounces.
Mix.	

HAIR-CURLING FLUIDS.

Carrageen moss	½ ounce.
Cologne	1 ounce.
Extract of millefleur	1 ounce.
Water	1 pint.

Mix. The moss is allowed to swell in water over night, is then heated until it dissolves, and is then strained, perfumed, and colored red with carmine, or yellow with tincture of saffron.

Mucilage of gum-Arabic	2 ounces.
Salts of tartar	1 ounce.
Rose-water	1½ pints.
Orange-flower water	4 ounces.

Mix. Color with carmine.

EXCESSIVE HAIRINESS

Very strange, mortifying disfigurement is sometimes occasioned by a great growth of hair in unusual situations on the body. Extreme cases of it are sometimes seen in museums under the designation "bearded woman," or "dog-faced man." Superabundant growth of hair is more common in persons of a dark, rather than of a light complexion. One of the most extraordinary instances known of excessive hariness was one of a Burman who was covered from head to foot with hair eight inches long upon cheeks, ears, and nose, and from four to five inches upon the breast and shoulders. The daughter and the grandchild of this man had the same peculiarity. Of the daughter and grandchild, Sir Henry Yule wrote: "To-day we had a singular visitor at the Residency. This was Maphoon, the daughter of Shevemaong, the *homo hirsutus* described and depicted in Crawford's narrative, where a portrait of her as a young child also appears. Not expecting such a visitor, one started and exclaimed involuntarily as there entered what at first sight seemed an absolute realization in the flesh of the dog-headed Anubis.

"The whole of Maphoon's face was more or less covered with hair. On a part of the cheek and between the nose and mouth this was confined to a short down, but over all the rest of the face was a thick silky hair of a brown color, about the nose and chin, four or five inches long. On the *alæ* [the wings] of the nose, under the eye, and on the cheekbones, this was very fully developed; but it was in and on the ear that it was most extraordinary. Except the extreme upper tip, no part of the ear was visible. All the rest was filled with and veiled by a large mass of silky hair, growing apparently out of every part of the external organ, and hanging in a dependent lock to a length of eight or ten inches. The hair over her forehead was brushed so as to blend with the hair of the head, the latter being dressed (as usual with her countrywomen) *a la Chinoise*. It was not so thick as to conceal altogether her forehead.

"The nose was densely covered with hair, as no animal's is that I know of, and with long, fine locks curving out and pendant like the wisps of a fine skye terrier's coat, had a most strange appearance. The beard was pale in color and about four inches in length, seemingly very soft and silky Her neck, bosom, and arms appeared to be covered with a fine, pale down, scarcely visible in some lights. Her husband and two boys accompanied her. The elder boy, about four or five years old, had nothing abnormal about him. The youngest, who was fourteen months old, and still at the breast, was evidently taking after his mother. There was little hair on the head; but the child's ear was full of long, silky floss, and he could boast of a mustache and beard of pale, silky down, that would have cheered the heart of many a coronet. In fact, the appearance of the child agrees almost exactly with what Crawford says of Maphoon herself as an infant.

"This child is thus the third in descent exhibiting this strange peculiarity, and in this third generation, as in the two preceding, this peculiarity has appeared only in one individual."

The preceding case of abnormal hairiness is as extraordinary as one can possibly be. There was a similar one in that of Julia Pastrana, exhibited in London many years ago. One of less intensity appeared many years ago in this country, in which a mother and child had profuse beards. Nevertheless, it is not uncommon to find individual unnoted men so covered with a short growth of hair that, at a short distance, the body presents a bearlike aspect. Sometimes women have a very decided manlike growth of mustache, which, by the way, they have sometimes been so injudicious as habitually to shave, with the inevitable result of increasing the thickness of the individual hairs and thus making the deformity, shaved or unshaved, still more visible. There is one and only one remedy for this deformity, which, in the case of a woman, is a real affliction. The galvanic needles, used at the root of each individual hair, extirpate it, because the roots are thereby destroyed. It is a comparatively painless

operation that is needed to receive in return the boon of removal of feminine unsightliness; the slight pang of a moment for the removal of each hair, and all is over.

Growth of hair may be excessive either as to length or as to profuseness. It may affect only those portions of the body upon which hair naturally grows, or it may include places which are ordinarily bare. Excessive hairiness may first appear after recovering from a severe fever. It sometimes occurs in insane persons after injury to the nerves, resulting in paralyzed parts of the body. Sometimes the employment of irritating substances on the skin will excite an unusual growth of hair.

If hairiness affect only a small area, as, for instance, the surface of a mole, it can easily be removed by the electric needles, in which case the mole itself will be extirpated. It is sometimes a matter of surprise for those conversant with the ease and efficaciousness with which this operation can be performed, to see women of a certain age and condition allow the blemishes of hair or moles to remain upon their faces. What may, in the case of a young girl, be a mere "beauty-spot" of a flat mole, often becomes with age a pendant tear of brown flesh.,

When abnormal hairiness includes a large area, again the galvanic needles afford the best method of getting rid of it. Lest the reader should imagine, despite the previous assurance that they involve only a slight operation, that it is more serious than represented here, it will now be described. Two little platinum needles, as sharp as cambric ones, are attached respectively to the rheophores (the electrically conducting cords) of a galvanic battery. The needles are, first of all, painlessly (their sharpness secures that) passed into opposite sides of the root of a hair or the base of a mole. Then a very light current of electricity is turned on to them for a second; the patient experiences a trifling sensation of prickling, and all is over. Sometimes the needle of only the negative pole is made to pierce the point to be treated, and then the patient seizes with one hand a moist sponge attached to the positive pole, and thus himself com-

pletes the circuit of electricity which in a moment kills hair or mole. Of course the number of treatments necessary to eradicate hair over an extensive surface will depend upon the extent of that surface. If very many individual hairs have been removed at a sitting the general surface will have become irritated, but this can be relieved by the action of cocaine. If swelling of the part should supervene after an operation, a water-dressing to it or of zinc ointment will relieve the inflammation.

Some caustic substances are able to destroy hair by obliterating the follicles and papillæ of the hair. But they are not to be recommended, because, when strong, they produce not only too great inflammation, but also scarring. A formula for a depilatory (destroyer of hair) is the following:—

Sulphide of barium	3 drachms.
Oxide of zinc	2 drachms.
Arrow-root powder	2 drachms.
Mix.	

ATROPHY OF THE HAIR.

Atrophy of the hair involves in it structural change, the thickness of each individual hair's diameter becoming either decreased or increased throughout the whole or only part of its length. Bulbous swellings sometimes appear at a single or at irregular intervals. These swellings may have a dark or a shiny appearance, and the hair is liable to break off there with a ragged end. In some cases the hairs at the points of thickening are alternately bright and dark, producing a beaded appearance. This form of the disease generally attacks the mustache and beard, but may occur upon the back of the head or upon other parts of the body. In other cases the hair becomes very brittle and easily splits and breaks. It may be rough, thin, or flat. The changes may occur within the hairbed, before the shaft of the hair has emerged, and the hairs there curled up may give rise to much irritation. The ragged ends may excite suspicion of the presence of ringworm, but in ringworm the inflamed patches have a circular form.

Atrophy of the hair may be due either to local or to constitutional causes. It may follow fever or other debilitating disease. Tetter, oily disease, or other affection of the skin may also produce it. For its treatment the first object to be achieved is to try to discover its cause. If this can be accomplished there will be reason to hope for the restoration of the hair to a healthy condition. In most cases the general health is impaired, and therefore constitutional remedies, tonics, such as iron and cod-liver-oil would be beneficial. The direct treatment of the affected hair usually yields the best results. The broken, ragged ends should be plucked out by the roots. If only a few hairs are affected, an ointment containing ten per cent. of the oleate of mercury, rubbed upon the parts once or twice a day, will promote their nutrition and their restoration to a healthy growth. If a large number of hairs are diseased the best treatment consists in clipping off the ragged ends, or else in cutting off the hair to the scalp. The ointment just mentioned is then applied.

Lanolin is very useful for improving the nutrition of the hair. An ointment of the nitrate of mercury, or one of ammoniated mercury, thirty to sixty grains to the ounce of lard, is a good application. The following one has been found serviceable :—

Oil of nutmeg	2	drachms.
Oil of chamomile	2	drachms.
Fluid oleates of mercury (10 per cent.)	2	ounces.
Oil of verbena	10	drops.
Oil of rose	2	drops.
Oil of ergot	2½	ounces.

Mix.

The stimulating remedies here previously described as serviceable in the treatment of baldness may also do good in cases of atrophy of the hair. When the hair is the subject of bulbous swellings along its shafts, perhaps the best application of all is the tincture of cantharides (Spanish-fly). The affection is very apt to be obstinate, especially in the cases of persons advanced in years.

CHAPTER XIX.

THE NAILS AND THEIR DISEASES.

THE nails being appendages of the scarf-skin, merely a modified form of it, deriving their sustenance from the upper portion of the true skin, suffer in consequence of general disease or of a depressed condition of the system. When the blood is impoverished and its red corpuscles are diminished in number, constituting the condition known as anæmia, the nails, as well as the mucous membranes and skin, assume a pallid hue. In *chlorosis* (green sickness), the nails, instead of looking pink, as they do in health, are very pale. They look even deadly white in *leukæmia*, a disease characterized by an immense preponderance of the white over the red corpuscles of the blood. In a variety of anæmia called progressive, pernicious anæmia, the nails are apt to become thickened and crack and crumble at the ends. In scurvy, haemorrhages may occur beneath the nails and there excite inflammation of their beds, with consequent loss of the nails. In *diabetes mellitus* a total loss of nails is not unusual, and cases occur in the disease where this is one of the first symptoms of its attack. Nails may drop off simply from failure of their proper nutrition. Their loss may also be caused by inflammation under and around them. Serious organic diseases of the nervous system may cause shedding of the nails.

Nails are sometimes reduced to mere horny plates upon the fingers, or they may become curved in such a manner as to resemble talons. In some cases they become thick, hard, or crossed by ridges and furrows. In others they are marked by milk-white patches. These are sometimes arranged in the form of transverse bands, so that the nail presents alternating stripes of pink and white. Again, the nails sometimes become black, die, and fall off. Hysteria and extreme fright sometimes lead to spontaneous shedding of the nails. In chronic rheumatism they may

become thickened, rough, or furrowed. Spontaneous shedding of the nails sometimes takes place without obvious impairment of the general health, and, at times, very strangely, this loss occurs at periodic intervals. A similar phenomenon has been known to follow typhoid fever. A more common occurrence in typhoid fever is, however, the crossing of the nails by transverse bands or furrows. The part of the nail which grows during the fever is thinner than the following growth of healthy nail, and is also rough and of a dull white. Typhus fever also causes white bands or furrows on the nails. After scarlet fever and small-pox the nails may be shed, or else they may have become grooved. White bands or furrows occur upon the nails after inflammatory rheumatism. In gout the nails may lose their polish and have a tendency to split and break. Sea-sickness, diarrhoea, and nervous exhaustion may produce furrows upon the nails. In consumption they often become thick, curved, and clubbed. In scrofula they are sometimes enlarged, deeply grooved, and are of a firm, horny consistency.

Malignant onychia is a serious inflammation of the bed of the nails, and sometimes occurs in scrofulous children. It usually attacks a finger-nail. For three or four weeks before the manifestation of inflammation the end of the finger is very painful. Eventually a swelling appears beneath the end of the nail, increases, and an obstinate ulcer is formed there. This ulcer, at first situated under the free edge of the nail, gradually spreads backward until it involves the whole bed of the nail. It bleeds easily, and its discharge is of an unhealthy and offensive character. The nail becomes of a brownish or black color, and is loosened by the ulceration. It may come off altogether, or may come away in fragments. It does not, however, always fall, but sometimes continues to grow in a distorted shape, being apt to point directly upward. The end of the finger having become enlarged, the nail also may be enlarged and curved. The surrounding skin is hard, shiny, and of a purplish color. This disease is, fortunately, not very common; but it is of a

very obstinate character when it does occur, the ulcer manifesting no disposition to heal and sometimes continuing for years. Patients suffering from it require constitutional treatment by codliver-oil, syrup of iron, compound syrup of the hypophosphites, etc. An operation is needed for the removal of the diseased nail. The ulcer is treated by covering it with some antiseptic agent, such as iodoform, aristol, europhen, or by a mixture of aristol and europhen, or powdered red cinchona bark.

Disease of the nails may be caused by injury, by the extension of some disease of the skin to the bed of the nails, or by parasitic invasion. The most common affection is from ingrowing nails, which is, however, only a variety of overgrowth of the nail. In overgrowth of the nail, the nail may be unduly increased in length, thickness, or width; and it may be increased at the same time in all three of those dimensions, and, in consequence, secondary changes may result. When the nail grows to an inordinate length it may curve downward and form a very close resemblance to a claw. Increase in width, which is more common than the other kinds, making encroachment of the nail upon its fleshy borders, causes very painful inflammation. The soft flesh may swell, matter may form, and an ulcer may be developed. Occasionally the affection has been so severe as to attack the bone of the toe. In another form of overgrowth the nail is extremely thickened, is, as a whole or in part, elevated from its bed, and becomes a deformity and source of great discomfort if the great toe happens to be the part attacked. When it is the finger-nail that is involved the sensibility of touch is lost, and it becomes impossible for the sufferer to perform any operation requiring nicety of manipulation. The upper surface of the nail is discolored and may be opaque, streaked, yellowish, brownish, or black, may be uneven or marked by ridges and furrows. The lower surface is apt to be brittle and of a dirty brown color. The consistency of the nail may be altered, may be thicker or thinner, harder or softer, tougher or more brittle than in the state of health.

Inflammation of the bed of the nail may lead to alteration in the intimate structure of the nail. There are varieties of this inflammation which attack artisans. Confectioners, and especially makers of candied fruits, suffer from an affection caused by dipping the finger ends into sweet, sour, and hot solutions. The nails become dry, dark, and brittle, and are shed in the form of little chips.

Strange growths of the nails have been recorded. Sometimes two nails have grown upon the same finger or upon the same toe. A nail may be found in a most unnatural situation, as upon the shoulder, or upon the stump of an amputated limb.

Overgrowth of the nails may affect a single one of them, several, or the whole of them. It is more common upon the toes than upon the fingers. The affection sometimes dates from birth, but, in the vast majority of cases, is acquired in later life. It is due partially to carelessness in the treatment of the parts. Certain diseases of the skin and of the general system also excite overgrowth. The affection is most common in old age.

When the disease has been produced by another, remedies appropriate to the original one must be administered. Tonics and constitutional remedies generally improve the health of the nails. The excessive growth may be carefully removed by a knife. Paring the free edge of the nails and pressing back the fold of skin which envelops their base and sides tends to restrict the nails to proper growth. In mild cases this treatment, together with the application of a soothing or an astringent ointment, will suffice to effect a cure. An ointment containing the oleate of tin or of lead has been found most serviceable. If the edge of the nail be brittle, it may be protected by wax or gum. An ointment of salicylic acid also serves a good purpose. If the affection be due to an invasion of fungus parasites, the use of water upon the part affected must be intermittent for a while, for water is favorable to their growth and multiplication. If the affection be known to be parasitic, the employment of oleate of mercury or of copper ointments is advisable. If the soft parts

are very red and swollen, it is well to relieve them of the surcharge of blood by puncturing, by leeching, or by paring off the diseased tissue, after which they can be treated with a soothing lotion.

Ingrowing nails can, in an early stage of the affection, be relieved by gently introducing a pledge of absorbent cotton between the nail and the fold of the skin by which it is surrounded. By this process the edge of the nail is gradually raised and can at last be cut off without causing pain. If the soft parts of the skin are very irritable, a solution of cocaine can be used to blunt their sensibility before the pledge of cotton is put in place. When the case is more advanced, when the great toe is swollen and painful, a stick of nitrate of silver applied to the affected surface at the inner border of the toe affords decided relief. The cotton pledge can then be worked under the fold of skin surrounding the nail in the manner already described. By this method the nail is saved, the patient avoids an operation, and is not compelled to give up his usual pursuits.

Another affection of the nails is atrophy. They become small, thin, brittle, and easily bent or broken. Their surface may be smooth and present no alteration in appearance, or it may be opaque, cracked, and yellow. The condition may be present at birth or it may arrive at any age. When it occurs at birth, it is generally accompanied by an imperfect development of the finger-ends and by the absence of hair. Deficient growth of the nails may be caused by fevers, nervous and other constitutional diseases, or by any adverse local condition which affects the nail-bed, and, consequently, the nutrition of the nail. It may be produced by injury, and it may even follow a preceding excessive growth of nail. The nails may crumble away almost entirely and be represented only by layers looking like parchment. In children the bed of the nail sometimes becomes swollen and painful, and the nail itself raised, when it breaks and almost or entirely disappears. This form of atrophy of the nails attacks several nails in succession, and all of them may eventually become in-

volved.. If it be possible to discover the cause of the defective growth, measures should be adopted for its removal. If the nails affected are painful and their condition interferes with the occupation of the sufferer, an ointment of the oleate of lead or of zinc and the use of protective wax or gum over them will be useful. The application of olive-oil, codliver-oil, oleate of mercury ointment, or mercurial plaster will sometimes excite towards a healthy growth.

Tetter of the nails is a disease which generally proceeds from tetter of the hands and fingers. The skin around the sides of the nails becomes red and thickened, the nails lose their natural polish and become rough and uneven. They may become very thin and brittle, and may even assume a worm-eaten appearance. After a while they become broken and are shed, and those which are reproduced may become gradually of a healthy and natural appearance as the disease subsides. Whether situated upon the hands or upon remote parts of the body, tetter usually induces an impaired nutrition of the nails without great alteration in their structure. In exceptional cases eczema is strictly confined to the nails. In these cases there may be redness, swelling, moisture of the surrounding skin, or it may be dry from beginning to end. In the case of its dryness, the nail is roughened and thickened, and fissures run along it lengthwise or across. Sometimes the nail becomes exceedingly arched, and sometimes it is shed. Although no other part of the body may be at the same time affected, it is thus proved, in these cases, that the person attacked must have previously suffered from tetter. The best application for atrophy of the nails is an ointment of oleate of tin. Salicylic acid, dissolved in alcohol, and used as a lotion, or made into an ointment, is a useful dressing. Of course, constitutional treatment should accompany the local one.

The same parasite which produces ringworm of the body occasionally penetrates the substance of the nail. The involved structure becomes, in consequence, dry, opaque, and brittle, is more or less thickened and distorted, and is apt to be shed in

layers. In exceptional instances ringworm of the nail occurs in the absence of the disease of ringworm upon other portions of the body. In such, it is acquired by adults in taking care of children suffering from the disease as located upon the scalp. As a general rule, however, ringworm of the nails occurs as a consequence of ringworm on the body of the individual sufferer, and the parasite does not usually attack the nails.

It is well to repeat, lest it be forgotten, that, in parasitic disease, water should be used on the parts affected as little as possible. The diseased portions should be, whenever feasible, removed by the knife, and the surface uncovered treated with a ten to twenty per cent. ointment of the oleate of mercury until the diseased part of the nail has been entirely shed. It is sometimes advantageous to employ the ointment of the oleate of copper or of tin, alternately with the oleate of mercury. Paring away the nail is facilitated by softening it with a solution of potash and water.

CHAPTER XX.

COSMETIC PREPARATIONS.

COSMETIC preparations as known to the world profess to improve the skin and thus beautify the complexion.

It follows, of course, that there must be at least some of them which are useless to that end, even if not injurious. Whatever goodness any of them possess is entirely due to their direct action upon the health of the skin, but this function also depends upon the activity of the nervous system and the purity of the blood. The hygienic methods for securing pure blood and a clear complexion have been amply dwelt upon in the preceding chapters. If the laws of health be transgressed, the skin, complexion, and beauty must suffer, despite all the cosmetics in the world. If, however, the chief sources of beauty have been regarded by following a rational course of life, there can be no objection to the use of certain ones among preparations for the toilet which serve merely to conceal blemishes and enhance physical charms. It need hardly be added that such preparations must be far from injurious to the skin either from their constituents or their strength. Many preparations sold and used are gradually injurious to the skin, which they render rough and harsh, and some are even injurious to the general health, their poisonous ingredients being absorbed through the skin by the blood.

There are, as every one knows, external conditions which may mar the sightliness of the healthiest skin. Immoderate heat or cold, the bites or stings of insects are causes continually present, and these are effectually combated by means of various combinations for application to the skin. Among cosmetic preparations are naturally included tooth-powder and tooth-lotions, dentrifices of all sorts, the habitual use of which sensibly enhances the beauty of the teeth, and to these must be added preparations that impart curl and lustre to the hair.

The following recipes are drawn from my own experience and the various authorities recognized as among the best in the world.

Ointments and Pomatums.

Fatty preparations* are, to a certain extent, food for the skin, and are promotive of its health. Excepting in moderate quantity for the scalp and hair, they cannot be used save at night. But at night, just before retiring, the face, the hands, protected by gloves, may be usefully treated with fatty preparations. Among them nothing is more bland and soothing than cold cream. The following formula represents a very fine and what druggists call elegant preparation of this household remedy for many applications to children and grown persons:—

COLD CREAM.

Oil of sweet almonds	26 ounces.
Odorless castor-oil	6 ounces.
Pure benzoated lard	8 ounces.
Genuine white wax	8 ounces.
Rose-water (in winter less, in summer more, than amount named)	12 ounces.
Orange-flower water	8 ounces.
Oil of rose	½ ounce.
Extract of jasmine	6 drachms.
Extract of cassia	4 drachms.
Powdered borax	2 ounces.
Pure glycerine	4 ounces.

Mix. Melt the oil of sweet almonds and the lard together and stir in the castor-oil. Make a solution of the borax in the glycerine, rose, and orange waters, and add this solution gradually to the melted fats, stirring constantly to ensure the thorough incorporation of all the ingredients. Finally, add the oil of rose, dissolved in the extracts, and beat up the ointment until cold.

With cold cream prepared in the preceding manner as one of its constituents, a fatty application for the skin can be prepared as follows:—

* For further information on fatty preparations, see author's work on "Ointments and Oleates," second edition, F. A. Davis, publisher, Philadelphia, Pa., 1890.

Cold cream	1 pound.
Glycerine	4 drachms.
Best carmine	6 grains.

Mix. Rub the carmine well into the glycerine, and then incorporate them with the cold cream.

Another formula for cold cream is the following:—

Spermaceti	3 ounces.
White wax	1 ounce.
Oil of almonds	8 ounces
Borax	½ ounce.
Glycerine	2 ounces.
Rose-water	2 ounces.
Oil of rose	10 minims.
Extract of jasmine	½ ounce

Mix. Mix the wax, oil of almonds and spermaceti, and melt at a low heat. Dissolve the borax in the glycerine and rose-water previously mixed. Pour this solution gradually, and with constant stirring, into the melted mixture until the product becomes snow-white. Then add the perfume.

The formulæ for the making of cold cream are various. The following ones are taken from "The Pharmaceutical Journal":—

COLD CREAM.

White wax	3 ounces.
Spermaceti	3 ounces.
Almond-oil	16 ounces.
Rose-water	8 ounces.
Otto of rose	20 drops.

Mix.

COLD CREAM (VASELINE).

Vaseline	14 ounces.
Paraffine	1 ounce.
Lanolin	4 ounces.
Otto of rose	5 drops.
Vanilla	4 grains.
Rectified spirits	2 drachms.
Water	6 ounces.

Mix.

COLD CREAM.

White wax	2 ounces.
Spermaceti	3 ounces.
Almond-oil	8 ounces.
Prepared lard	5 ounces.
Water	6 ounces.
Otto of rose	10 drops.
Oil of bergamot	10 drops.

Mix.

There is a similar preparation to this made by the introduction of cotton-seed oil, as follows:—

COLD CREAM.

Cotton-seed oil	15	ounces.
Spermaceti	3½	ounces.
White wax	3½	ounces.
Oil of lavender-flowers	12	drops.
Rose-water	7¾	ounces.

Mix.

CREAM OF NUTS (CREME DE NOUVEAUX).

Bitter almonds (blanched and beaten)	1	ounce.
Proof spirits	10	ounces.
Sugar	4	ounces.

Mix. This preparation is sometimes colored with cochineal.

COLD CREAM (VIOLET).

Oil of violets	2	pints.
Violet-water	2	pints.
Wax	2	ounces.
Spermaceti	2	ounces.
Oil of bitter almonds	10	drops.

Mix.

The composition of cold cream may be further modified as follows:—

CAMPHOR COLD CREAM (CAMPHOR-ICE).

Oil of almonds	2	pints.
Rose-water	2	pints.
Wax	2	ounces.
Camphor	4	ounces.
Oil of rosemary	2	drachms.

Mix.

Another recipe for cold cream of the form of a camphor-ice is as follows:—

CAMPHOR-ICE.

White vaseline	8	ounces.
Hard paraffine	5	ounces.
Camphor	2	ounces.

Mix. This is an excellent application for chapped hands, fever blisters, etc.

CREAM SHAMPOO.

Shredded fine white soap	$\frac{1}{2}$ ounce.
Rose-water	1 ounce.
Solution of ammonia	1 ounce.
Alcohol or bay rum	$\frac{1}{2}$ ounce.
Rain-water	8 ounces.

Mix. Dissolve the soap in the heated rain-water. When nearly cool add the ammonia, rose-water, and the alcohol, stirring constantly.

COLD CREAM (HONEY-AND-ALMOND).

Cold cream	5 parts.
Oil of sweet almonds.....	5 parts.
Glycerine	5 parts.
Boric acid	5 parts.
Solution of soda	2 parts.
Mucilage of quince seed (2 drachms to a pint)	25 parts.
Oil of bitter almonds and oil of rose (enough to perfume).	
Water enough to make	200 parts.

Mix. Heat the cold cream, oil, and the solution of soda together, stirring until an emulsion is formed. Warm together the glycerine, acid, mucilage, and about one hundred and fifty parts of the water, and mix with the emulsion. Stir until cold, and make up to the two hundred parts by adding the rest of the water. Add the perfume. To make the skin soft and elastic.

CREAM (RECAMIER).

Oxide of zinc	4 ounces.
Glycerine	13 drachms.
Spirits of rose (four drachms to a pint)	1 drachm.
Water	5 drachms.

Mix. A valuable face cream.

CREAM (QUINCE-SEED).

Quince-seed	3 drachms.
Boric acid	8 grains.
Glycerine	4 ounces.
Alcohol	6 ounces.
Carbolic acid	20 grains.
Cologne	4 drachms.
Oil of lavender	40 drops.
Glycerine of starch	4 ounces.
Water enough to make	2 pints.

Mix. Dissolve the boric acid in eight ounces of water, bruise the quince-seed, and macerate in the solution for three hours. Press through a straining cloth. Add the glycerine, carbolic acid, and glycerine of starch, and mix thoroughly. Mix the cologne and the oil of lavender with the alcohol, add them to the mucilage and mix again thoroughly. For a dry and irritable skin.

CREAM-BALM.

White wax	1 drachm.
Paraffine	½ drachm.
Oil of sweet almonds	2 drachms.

Mix. Stir well until cold. Having dissolved in a mortar a half drachm of the nitrate of soda in half a drachm of water, mix thoroughly the above ingredients of salve with this solution and finally add—

Oil of lemon	10 drops.
Oil of orange	2 drops.

COLD CREAM (CUCUMBER).

Oil of almonds	2 pints.
Green oil	2 ounces.
Cucumber juice	2 pints.
White wax	2 ounces.
Spermaceti	2 ounces.
Cucumber essence	4 ounces.

Mix. The cucumbers are squeezed, the juice boiled and skimmed, quickly cooled, and filtered through linen. As, however, the aroma of the cucumber is destroyed by heat, a better proceeding is to slice the cucumbers as thin as possible, place them in olive oil, and allow them to stand immersed for twenty-four hours. The oil should then be filtered off and fresh slices of cucumber be placed in it. After they have stood in it, the oil is ready to be incorporated with cold cream prepared in the manner heretofore described.

Ointments similar to cold cream are prepared in like manner. The one immediately following was at one time famous when pomatum was largely used by both sexes for the hair:—

COLD CREAM (POMMADE-DIVINE).

Lard	1 pound.
Spermaceti	½ pound.
Oil of almonds	1½ pounds.
Benzoin	½ pound.
Vanilla	3 ounces.

Mix. The ingredients are heated together at a temperature not exceeding one hundred and sixty-two degrees Fahrenheit. After five or six hours they are strained and put into pots.

CAMPHOR-PASTE.

Purified lard	½ pound.
Wax	2 ounces
Spermaceti	2 ounces.
Camphor	2 ounces.
Oil of almonds	1 pint.

Mix. The ingredients to be melted and then beaten up together until cold.

CREAM OR MARROW POMADE.

Lard	8 pounds.
Ox-marrow	4 pounds.
Oil of lemon	2 ounces.
Oil of bergamot	1 ounce.
Oil of cloves.....	5 drachms.

Mix. The fats are melted and beaten up for half an hour, or longer, until they have become cold. Use for the hair as a pomade.

Perfumes, Soaps, Colognes, Etc.

COMPOUND ESSENCE OF ORRIS-ROOT.

Vanilla-bean cut fine.....	2 drachms.
Bruised orris-root	6 drachms.
Essence of Peruvian balsam.....	1 ounce.
Alcohol	16 ounces.

Mix. Macerate for fourteen days and then filter.

WHITE-LILAC EXTRACT.

Extract of tuberose	1 pint.
Extract of orange-flowers	4 ounces.
Oil of bitter almonds.....	3 drops.
Extract of civet	½ ounce.

Mix. The extract of civet is added only for the purpose of rendering the mixture more stable.

JONQUILLE-EXTRACT.

Extract of jasmine	14 ounces.
Extract of tuberose	14 ounces.
Extract of orange-flowers	7 ounces.
Extract of vanilla	½ ounce.

Mix.

VERBENA-EXTRACT.

Rectified alcohol	1 pint.
Oil of verbena	2½ drachms.
Oil of lemon-peel	2 ounces.
Oil of orange-peel	½ ounce.

Mix.

VERBENA-EXTRACT.

Rectified alcohol	1 pint.
Oil of lemon-peel	2 ounces.
Oil of orange-peel	1 ounce.
Oil of verbena	2½ drachms.
Extract of orange-flowers	6¼ ounces.
Spirit of rose	½ pint.

Mix.

WINTERGREEN-EXTRACT.

Spirit of rose	1 pint.
Essence of lavender	4 ounces.
Extract of neroli	½ pint.
Extract of vanilla	4 ounces.
Extract of vilivert	4 ounces.

Mix.

LILY-OF-THE-VALLEY EXTRACT.

Essence of tuberose	8 ounces.
Jasmine essence	1 ounce.
Orange-flower essence	1 ounce.
Rose-spirit	1 ounce.
Tincture of vanilla	1 ounce.
Rose-essence	1 ounce.
Bitter almond-oil	5 drops.

Mix.

MIGNONETTE-EXTRACT.

Rose-extract	4 ounces.
Cassia	4 ounces.
Tincture of myrrh	4 ounces.
Violet-extract	1½ ounces.
Jasmine-extract	1½ ounces.

Mix.

NEW-MOWN-HAY EXTRACT.

Extract of Tonka-bean	4 ounces.
Alcohol	4 ounces.
Rose-spirit	2 ounces.
Rose-extract	2 ounces.
Jasmine	2 ounces.
Oil of neroli	10 drops.
Oil of rose-geranium	60 drops.

Mix.

STEPHANOTIS-EXTRACT.

Cassia extract	1½ ounces.
Tuberose	1½ ounces.
Jasmine	14 ounces.
Musk	14 ounces.
Extract of orris-root	4 ounces.
Extract of Tonka-bean	1½ ounces.
Tincture of benzoin	2 ounces.
Tincture of storax	2 ounces.
Oil of bergamot	½ ounce.
Oil of rose	15 minims.
Oil of neroli	15 minims.
Alcohol	9 ounces.

Mix.

ORANGE-FLOWER EXTRACT.

Orange-flower essence	11	ounces.
Tincture of musk	1½	ounces.
Cassia extract	1½	ounces.

Mix.

MUSK EXTRACT.

Tincture of musk	11	ounces.
Rose-spirit	4	ounces.
Tincture of civet	6	drachms.

Mix.

MARIE STUART EXTRACT.

Rose-extract	8	ounces.
Jasmine	8	ounces.
Violet	8	ounces.
Cassia	8	ounces.
Tincture of musk	8	drachms.
Tincture of ambra	1½	ounces.
Tincture of orris-root	4	ounces.
Tincture of Tonka-bean	4	ounces.
Tincture of civet	4	ounces.
Tincture of benzoin	4	ounces.
Tincture of rose-oil	½	drachm.
Tincture of sandalwood	½	drachm.
Tincture of oil of neroli.....	1¾	drachms.
Tincture of oil of bergamot.....	1	ounce.
Rose-spirit	8	ounces.

Mix.

VIOLET-EXTRACT.

Violet-essence	14	ounces.
Rose-extract	4	ounces.
Cinnamon-extract	4	ounces.
Jasmine-essence	2	ounces.
Tincture of musk	2	ounces.
Tincture of orris-root	1	ounce.
Tincture of benzoin	1	ounce.

Mix.

WOOD-VIOLET EXTRACT.

Violet-extract	8	ounces.
Tincture of cassia	1½	ounces.
Tincture of orris-root	1½	ounces.
Tincture of musk	1½	ounces.

Mix.

The three following recipes are for inexpensive perfumes:—

Alcohol	1 pint.
Oil of bergamot	1 ounce.
Mix.	
Alcohol	1 pint.
Oil of French lavender	½ ounce.

Oil of bergamot	½ ounce.
Oil of cloves	¾ drachm.

Mix.

Alcohol	1 pint.
Oil of verbena	½ ounce.
Oil of lemon	1 ounce.

Mix.

SICILIAN ESSENCE.

Matured oil of English lavender.....	3 drachms.
Oil of English cloves	½ drachm.
Essence of musk	12 drachms.
Oil of bergamot	4 drachms.
Oil of yellow sandalwood	40 drops.
Essence of ambergris	4 drachms.
Oil of rose	1 drachm.
Heliotrope bouquet (given above).....	4 drachms.
Extrait Marechal	1 ounce.
Alcohol	7 ounces.

Mix.

HANDKERCHIEF PERFUME.

Essence of musk	4 ounces.
Oil of bergamot	1½ drachms.
Extract of jasmine	2 ounces.
Oil of English lavender	½ drachm.
Oil of neroli	½ drachm.
Oil of patchouli	10 drops.
Oil of cloves	10 drops.
Oil of rose	1½ drachms.
Oil of verbena	16 drops.
Oil of cassia	10 drops.
Alcohol enough to make, all told.....	80 ounces.

Mix. Macerate for one month, then filter three times.

ESSENCE OF PERUVIAN BALSAM.

Peruvian balsam	1 ounce.
Alcohol	9 ounces.

Mix. Macerate for two days and then filter.

HELIOTROPE-BOUQUET.

Heliotropin	4 drachms.
Compound essence of orris-root.....	30 ounces.
Extract of rose	8 ounces.
Extract of jasmine	8 ounces.
Oil of neroli	100 drops.
Oil of bergamot	2 drachms.
Essence of musk	4 ounces.
Otto of rose	2 drachms.
Compound essence of Tonquin bean.....	8 ounces.
Alcohol	80 ounces.

Mix. Allow mixture to stand for fourteen days, then strain three times through English gray filtering-paper.

MIXED SCENT.

Oil of lemon	2 drachms.
Oil of bergamot	2 drachms.
Essence of musk	2 drachms.
English oil of lavender	20 minims.
Oil of pimento	20 minims.

Mix.

COMPOUND ESSENCE OF TONQUIN-BEAN.

Bruised orris-root	2 drachms.
Tonquin-bean cut fine	6 drachms.
Essence of ambergris	30 drops.
Oil of Ylang-ylang	60 drops.
Compound essence of orris-root	4 ounces.
Oil of lemon	½ drachm.
Otto of rose	½ drachm.
Oil of bergamot	160 drops.
Alcohol	1 pint.

Mix. Macerate for fourteen days and then filter.

HELIOTROPE-WATER.

Oil of rhodium	1 drachm.
Oil of rose	1 drachm.
Oil of almonds	20 drops.
Tincture of orris-root	½ pint.
Tincture of vanilla	¼ pint.
Tincture of musk	1 ounce.
Alcohol (ninety-five degrees)	3 pints.
Triple rose-water	4 ounces.

Mix.

CHRISTIANI'S VOLATILE ESSENCE.

Oil of lavender	$\frac{1}{2}$ ounce.
Oil of bergamot	$\frac{1}{2}$ ounce.
Oil of cloves	$\frac{1}{4}$ ounce.
Oil of rhodium	1 drachm.
Strong aqua-ammonia	$2\frac{3}{4}$ ounces.

Mix. The above mixture is useful as a perfumed pungent to take the place of ordinary pungents, or smelling-salts.

NEW-MOWN HAY.

Extract of Tonka-bean	2 pints.
Extract of rose-geranium.....	1 pint.
Extract of orange-flowers	1 pint.
Extract of rose-leaves.....	1 pint.
Triple spirit-of-rose	1 pint.
Extract of jasmine	1 pint.

Mix.

NEW GARDEN NOSEGAY.

Extract of orange-petals	1 pint.
Extract of cassia.....	$\frac{1}{2}$ pint.
Extract of tuberose	$\frac{1}{2}$ pint.
Extract of jasmine	$\frac{1}{2}$ pint.
Extract of rose-geranium	$\frac{1}{2}$ pint.
Essence of musk	$1\frac{1}{2}$ ounces.
Essence of ambergris.....	$1\frac{1}{2}$ ounces.

Mix.

Various scented preparations are made for filling sachet-bags, etc. The substances used for the purpose are such as emit a perfume at ordinary temperatures.

POWDER OF A THOUSAND FLOWERS.

Powdered lavender-flowers	$2\frac{1}{2}$ pounds.
Powdered orris-root	$2\frac{1}{2}$ pounds.
Powdered rose-leaves	$2\frac{1}{2}$ pounds.
Powdered benzoin	$2\frac{1}{2}$ pounds.
Powdered Tonka-bean	6 ounces.
Powdered vanilla	6 ounces.
Powdered sandalwood	6 ounces.
Musk	$\frac{1}{2}$ drachm.
Civet	$\frac{1}{2}$ drachm.
Powdered cloves	6 ounces.
Powdered cinnamon	3 ounces.
Powdered allspice	3 ounces.

Mix.

LAVENDER-POWDER.

Powdered lavender-flowers	2½ pounds.
Powdered benzoin	6 ounces.
Oil of lavender	½ ounce.
Mix.	

ROSE-POWDER.

Rose-leaves	2½ pounds.
Powdered sandalwood	1¼ pounds.
Oil of rose	1 ounce.
Mix.	

VERBENA-POWDER.

Dried and powdered lemon-peel.....	2½ pounds.
Thyme	6 ounces.
Oil of verbena	2 drachms.
* Oil of lemon-peel	1 ounce.
* Oil of bergamot	2 ounces.

Mix.

VIOLET-POWDER.

Black currant-leaves	2½ pounds.
Cassia	2½ pounds.
Rose-leaves	2½ pounds.
Powdered orris-root	5 pounds.
Oil of bitter almonds	½ drachm.
Granulated musk	15 grains.
Powdered benzoin	¼ pound.

Mix.

Christiani gives the formulæ for various sachet-powders from which the following selections are made:—

HELIOTROPE-SACHET.

Ground rose-leaves	1½ pounds.
Ground orris-root	2 pounds.
Ground Tonquin-bean	½ pound.
Ground vanilla	¼ pound.
Ground gum-benzoin	¼ pound.
Ground musk-pods	½ ounce.
Oil of rose	½ drachm.
Oil of almonds	½ drachm.

Mix.

GERANIUM-SACHET.

Ground rose-geranium leaves	1 pound.
Ground orris-root	2 pounds.
Ground rhodium-wood	½ pound.
*Ground gum-benzoin	¼ pound.
Oil of geranium	½ ounce.

Mix.

A class of perfumes has lately been devised which is made by perfuming hard paraffine. The paraffine is melted and perfumed without its being raised to a very high temperature. The lids of ordinary two-drachm tin boxes may be utilized for moulds. From one to five drops of the liquid perfume are added to each mould.

The following formulæ are taken from Zielig's, for Solid Perfumes, as given in "The British and Colonial Druggist":—

WHITE-ROSE SOLID PERFUME.

Oil of geranium	$\frac{1}{2}$ drachm.
Oil of bergamot	$\frac{1}{2}$ drachm.
Oil of patchouli	5 minims.

Mix.

LAVENDER SOLID PERFUME.

Oil of lavender	2 ounces.
Essence of bergamot	1 ounce.
Oil of cassia	5 minims.
Oil of geranium	40 minims.
Oil of orange	5 minims.

Mix.

BOUQUET SOLID PERFUME.

Oil of coriander	18 minims.
Oil of cloves	2 drachms.
Oil of nutmeg	1 drachm.
Oil of lavender	3 drachms.
Oil of sandalwood	1 drachm.
Oil of bergamot	1 ounce.
Otto of rose	$\frac{1}{2}$ drachm.
Oil of geranium	$\frac{1}{2}$ drachm.
Oil of orange	10 minims.

Mix.

COLOGNE SOLID PERFUME.

Essence of bergamot	1 ounce.
Essence of lemon	1 ounce.
Oil of citronella	$\frac{1}{2}$ ounce.
Oil of neroli	$\frac{1}{2}$ ounce.
Oil of rosemary	80 minims.
Oil of geranium	10 minims.

Mix.

From the same source as that mentioned above the following formulæ for scented soaps are taken:—

ROSE-SOAP.

Curd-soap	187½ pounds.
White oil soap	63 pounds.
Oil of rose-geranium	1 pint.
Oil of palm-rose	13 ounces.
Oil of patchouli	2 drachms.
Oil of cloves	9 ounces

Mix.

VANILLA-SOAP.

Curd-soap	125 pounds.
Yellow soap	125 pounds.
Tincture of benzoin	4½ pints.
Extract of cumarin	1¾ pints.
Peruvian balsam	8 ounces.
Oil of lavender	1 pint.
Oil of rose-geranium	8 ounces.

Mix.

FRANGIPANI-SOAP.

Curd-soap	125 pounds.
Civet (rubbed up with sugar)	3 ounces.
Oil of neroli	6 ounces.
Oil of sandalwood	15 ounces.
Oil of rose	3 ounces.
Oil of vitivert	3 ounces.

Mix.

LAVENDER-SOAP.

Curd-soap	100 pounds.
Palm-soap	25 pounds.
Oil of lavender	9 ounces.
Oil of rose	1 ounce.
Oil of rose-geranium	1½ ounces.
Civet (rubbed up with sugar)	½ drachm.

Mix.

ORANGE-FLOWER SOAP.

Curd-soap	100 pounds.
Palm-soap	25 pounds.
Oil of orange-peel	8 ounces.
Oil of neroli	6¼ ounces.
Oil of rose	5 drachms.
Musk (rubbed with sugar)	15 grains.

Mix.

CEDAR-SOAP.

Curd-soap	125	pounds.
Oil of cedarwood	17	ounces.
Oil of rose	1 1/2	ounces.
Mix.		

SHAVING SOAP.

(Pharmaceutical Era.)

Best soft soap	2	ounces.
Cold cream	1	ounce.
Good white soap	8	ounces.
Oil of citronella	20	drops.
Essence of lemon	20	drops.

Mix.

PERSIAN-BOUQUET.

Oil of rhodium	1	drachm.
Oil of rose	1	drachm.
Oil of bitter-almonds	20	drops.
Oil of cloves	10	drops.
Oil little grain	1	drachm.
Tincture of orris-root	8	ounces.
Tincture of vanilla	4	ounces.
Tincture of musk	1	ounce.
Rose-water	4	ounces.
Cologne enough to make, all told.....	4	pints.

Mix the oils and the tinctures with the cologne, and then add the rose-water. Shake well, allow to stand for three days, then filter.

FLORIDA-WATER.

Oil of lemon	6	ounces.
Oil of lavender	8	ounces.
Oil of lemon-grass	2	ounces.
Oil of cloves	4	ounces.
Aleohol	5	gallons.
Distilled water	10	pints.

Mix.

FLORIDA-WATER.

Oil of lavender	2	drachms.
Oil of bergamot	2	drachms.
Oil of lemon	2	drachms.
Oil of neroli	1	drachm.
Oil of melissa	30	minims.
Otto of rose	10	minims.
Tincture of turmeric	1	drachm.
Spirituous menstruum	32	ounces.

Mix. "Spirituous menstruum" means alcoholic liquid.

FLORIDA-WATER.

Oil of lavender	1 ounce.
Oil of bergamot	1 ounce.
Oil of lemon	1 ounce.
Oil of cloves	1 drachm.
Oil of cinnamon	1 drachm.
Alcohol	½ scruple.

Mix, add a gallon of water, and filter.

EAU-DU-PORTUGAL.

Oil of bergamot	1 ounce.
Oil of lemon	2½ ounces.
Oil of orange-peel	½ pound.
Oil of rose	¼ ounce.
Alcohol	10 pints.

Mix.

EAU-DU-BOTOT.

Oil of peppermint	60 drops.
Oil of spearmint	30 drops.
Oil of cloves	10 drops.
Oil of red-cedar wood.....	1 drachm.
Tincture of myrrh	1 ounce.
Alcohol	1 pint.

Mix. Color with cochineal. The oil of cedar tops will not do instead of the oil of the wood. The oil of cedar tops smells like turpentine, whereas that of the wood is fragrant.

ORANGE-FLOWER WATER.

Take three or four drops of a fine quality of oil of neroli-petals and drop them on a piece of filter-paper three inches square. Put the paper in a quart bottle, pour into it four fluid-ounces of warm, distilled water, at a temperature of about one hundred degrees Fahrenheit, and shake it well for a couple of minutes. Then add warm, distilled water, to the amount of a pint, and shake the bottle again until its contents become cold. Lastly, filter. For perfumery, add two drachms of rose-water to the pint of the mixture.

VIOLET-WATER.

Essence of violet	4 ounces.
Essence of cassia	1½ ounces.
Essence of rose	1½ ounces.
Deodorized alcohol	2 pints.

Mix.

LAVENDER-WATER.

English oil of lavender	4	ounces.
Oil of bergamot	2½	ounces.
Otto of rose	1½	drachms.
Oil of neroli	½	drachm.
Spirit of nitrous ether	2½	ounces.
Grain-musk	15	grains.
Triple rose-water	12	ounces.
Rectified spirit	100	ounces.

Mix and keep for six weeks.

LAVENDER-WATER.

English oil of lavender	4	drachms.
Oil of bergamot	45	minims.
Essence of musk (four grains to an ouncee)	2	drachms.
Essence of ambergris (eight grains to an ouncee) ..	1	drachm.
Alcohol	19	ounces.

Mix. Set aside for a few weeks to clear.

GERANIUM-WATER.

French oil of rose-geranium	2	ounces.
Tincture of orris-root	4	ounces.
Tincture of ambrette	4	ounces.
Alcohol (ninety-five degrees)	3	pints.
Rose-water	½	pint.

Mix.

HUNGARY-WATER.

Spirit of lavender	1	part.
Spirit of sage	1	part.
Spirit of rosemary	3	parts.

Mix.

HUNGARY-WATER.

Grape spirit	1	gallon.
Otto of Hungarian rosemary	2	ounces.
Otto of lemon-peel	1	ounce.
Otto of melissa balm	1	ounce.
Otto of spearmint	½	drachm.
Triple esprit-de-rose	1	pint.
Extract of orange-flowers	1	pint.

Mix.

TRIPLE ESPRIT-DE-ROSE.

Rectified alcohol	1	gallon.
Otto of rose	3	ounces.

EUCALYPTUS-WATER.

Balsam of Peru	20 minimis.
Tincture of tolu	80 minimis.
Tincture of benzoin	80 minimis.
Tincture of Tonka bean	120 minimis.
Tincture of vanilla	160 minimis.
Tincture of musk	100 minimis.
Oil of eucalyptus	30 minimis.
Oil of neroli	4 minimis.
Rose-water	6 ounces.
Orange-flower water	6 ounces.
Alcohol	20 ounces.

Mix.

MAGNOLIA-SACHET.

Ground rose-leaves	1 pound.
Ground orange-flowers	½ pound.
Ground orris-root	2 pounds.
Ground benzoin	¼ pound.
Ground orange-peel	¼ pound.
Oil of almonds	1 drachm.
Oil of cedrat	2 drachms.

Mix.

ROSE-SACHET.

Ground rose-leaves	1½ pounds.
Ground orris-root	1 pound.
Ground rhodium-wood	1 pound.
Ground santal	½ pound.
Ground benzoin	¼ pound.
Otto-of-rose	2 drachms.
Brazil-wood	1 ounce.

Mix.

VERBENA-SACHET.

Ground lemon-thyme	1 pound.
Ground lemon-peel	2 pounds.
Ground orris-root	1 pound.
Oil of lemon-grass	½ ounce.
Oil of bergamot	1 ounce.

Mix.

VIOLET-SACHET.

Ground orris-root	2 pounds.
Ground rhodium-wood	½ pound.
Ground rose-leaves	½ pound.

Mix.

The two following are taken from Sniveley's "Manufacture of Perfumes":—

VIOLET-SACHET.

Powdered orris-root	6 ounces.
Ground red-rose petals	2 ounces.
Powdered benzoin	2 ounces.
Tonquin musk	8 grains.
Oil of bitter almonds	2 minims.

Mix. A little violet essence is a desirable addition.

ROSE-SACHET.

Ground red-rose petals	6 ounces.
Ground sandalwood	1½ ounces.
Oil of rose	½ drachm.
Oil of rose-geranium	½ drachm.

Mix. The above may be converted into white-rose sachet by the addition of a small amount of the extract of patchouli.

SACHET-POWDER.

(*Pharmaceutical Era.*)

Powdered coriander-seeds	1 ounce.
Powdered orris-root	1 ounce.
Dried rose-leaves (crushed)	1 ounce.
Powdered aromatic flag-root	1½ ounces.
Dried lavender flowers	2 ounces.
Oil of rhodium	20 drops.
Oil of bergamot	30 drops.
Musk (in grain)	5 grains.

Mix.

A number of elegant preparations for the making of cologne are known.

FIRST-QUALITY COLOGNE.

Alcohol (eighty-five degrees)	56 pints.
Oil of neroli-petals	3 ounces.
Oil of neroli bigarade	1 ounce.
Oil of rosemary	1 ounce.
Expressed oil of orange-peel	5 ounces.
Expressed oil of lemon	5 ounces.
Oil of bergamot	2 ounces.

Mix. The mixture should be allowed to stand for several days before being bottled.

FIRST-QUALITY COLOGNE.

Best alcohol (ninety degrees)	50	pints.
Oil of orange	1	ounce.
Oil of little grain.....	1	ounce.
Oil of orange-peel	2½	ounces.
Oil of lemon.....	6	ounces.
Oil of bergamot	6	ounces.
Oil of rosemary.....	½	ounce.
Oil of English lavender	½	ounce.
Mix.		

SECOND-QUALITY COLOGNE.

Purified corn-spirit	56	pints.
Oil of little grain.....	3	ounces.
Oil of neroli-petals	5	drachms.
Oil of rosemary.....	5	drachms.
Oil of orange-peel	4	ounces.
Oil of lemon.....	4	ounces.
Oil of bergamot	4	ounces.
Mix.		

SECOND-QUALITY COLOGNE.

Finest alcohol (eighty-five degrees)	80	pints.
Oil of neroli.....	5	drachms.
Oil of little grain.....	5	drachms.
Oil of orange-peel	1½	ounces.
Oil of lemon.....	4	ounces.
Oil of bergamot	20	ounces.
Oil of lavender	5	drachms.
Oil of thyme	2½	drachms.
Oil of rosemary.....	2½	drachms.
Mix.		

THUM'S COLOGNE.

(Pharmaceutical Era.)

Oil of lavender	1	drachm.
Oil of bergamot	2	drachms.
Oil of lemon	2	drachms.
Alcohol	4	pints.
Distilled water	4	ounces.
Orris-root	1	ounce.
Tincture of benzoin	½	ounce.
Tobae-vanilla	10	grains.
Musk	1	grain.
Jasmine	½	ounce.

Mix. Let stand for some time, then filter.

FARINA-COLOGNE.

Oil of bergamot	4	ounces.
Oil of lemon.....	1½	ounces.
Oil of neroli bigarade	3	ounces.
Oil of rosemary	3	ounces.
Oil of cloves	½	ounce.
Oil of lavender	½	ounce.
Deodorized alcohol	2½	gallons.
Rectified spirits	1½	gallons.

Mix.

COLOGNE.

(Pharmaceutical Era.)

Cologne spirits	3	pints.
Triple extract of rose	1	pint.
Extract of musk	3¾	ounces.
Tincture of ambergris.....	4	ounces.
Tincture of vanilla	2	ounces.
Tincture of orris-root	8¾	ounces.
Tincture of Tonka-bean	4	ounces.

Mix.

COLOGNE.

(Pharmaceutical Era.)

Oil of neroli.....	1	part.
Oil of patenouli	2	parts.
Oil of sandalwood	2	parts.
Oil of lavender	3	parts.
Oil of rose-geranium	3	parts.
Oil of Canada snake-root	9	parts.
Tincture of musk	40	parts.
Water	140	parts.
Deodorized alcohol	800	parts.

Mix.

GRAVES'S WHITE-ROSE COLOGNE.

Oil of rose	1	drachm.
Oil of bergamot	1½	drachms.
Oil of patchouli	10	drops.
Oil of sweet oranges	1	drachm.
Tincture of orris-root	8	ounces.
Tincture of musk	2	ounces.
Tincture of civet	2	ounces.
Extract jasmine (from pomade)	4	ounces.
Cologne spirit (deodorized alcohol).....	4½	pints.
Rose-water	8	ounces.

Mix. Dissolve the oils in the spirit, add the tinctures, and lastly, add the rose-water. Let stand three days, and filter with a half-ounce of magnesia. Color green, if desired, with tincture of ambergris, a few grains of green aniline dissolved in alcohol, or with tincture of chlorophyl.

ANTISEPTIC COLOGNE.

(Pharmaceutical Era.)

Cologne water	8 ounces.
Chloral hydrate	2 drachms.
Quinine (alkaloid)	10 grains.
Carbolic acid	30 grains.
Oil of lavender	20 drops.

Mix.

WHITE-ROSE COLOGNE.

(Pharmaceutical Era.)

Triple extract of white rose.....	1 ounce.
Oil of rose	3 drops.
Oil of geranium	3 drops.
Cologne spirit	26 ounces.
Hot water	6 ounces.

Mix. Coloring (a sufficient quantity).

CHRISTIANI'S AMMONIATED COLOGNE.

Cologne essence	1 ounce.
Alcohol	2 pints.
Ammonia-water F. F. F.	2 ounces.

Mix.

MYRTLE-COLOGNE.

Extract of jasmine	½ pint.
Extract of orange-flowers	2 pints.
Extract of rose	4 pints.
Extract of tuberose	2 pints.
Tincture of vanilla	2 pints.

Mix.

NARCISSUS-COLOGNE.

Extract of jonquille	1 pint.
Extract of tuberose	3 pints.
Tincture of storax	4 ounces.
Tincture of tolu	4 ounces.

Mix.

PINK-COLOGNE.

Extract of cassia	2½ pints.
Extract of orange-flowers	2½ pints.
Extract of rose	5 pints.
Tincture of vanilla	20 ounces.
Oil of cloves	75 grains.

Mix.

SWEET-PEA COLOGNE.

Extract of tuberose	2	pints.
Extract of orange-flowers	2	pints.
Extract of rose	2	pints.
Tincture of vanilla	5½	ounces.

Mix.

POLYANTHUS-COLOGNE.

Extract of rose	2	pints.
Extract of jasmine	1	pint.
Extract of violet	½	pint.
Tincture of musk	2½	drachms.
Oil of neroli	¾	ounce.
Oil of lemon	¾	ounce.
Deodorized alcohol	4	pints.

Mix.

Toilet Preparations.

The following toilet requisites are of practical advantage.

ANTISEPTIC SOLUTION.

Benzoic acid	2	drachms.
Borax	2	drachms.
Boric acid	4	drachms.
Thymol	¾	drachm.
Eucalyptol	10	drops.
Oil of wintergreen	10	drops.
Oil of peppermint	6	drops.
Oil of thyme	2	drops.
Rectified spirits	5¾	ounces.
Water, enough to make, all told.....	31	ounces.

Mix. This is a pleasant antiseptic fluid for cleansing the skin and relieving any irritation and inflammation.

BAY RUM.

Oil of bay-leaves	2	drachms.
Proof Jamaica rum	10	ounces.
Alcohol	20	ounces.
Distilled water	10	ounces.

Mix and let stand for a week, and then filter.

BLEACH (MADAME RUPERT'S FACE-BLEACH).

(Christiani.)

Corrosive sublimate	7½	grains.
Tincture of benzoin	1	drachm.
Water	½	pint.

Mix.

BLONDE POWDER.

(Christiani.)

Levigated talc 1 pound.

Yellow-lake, a sufficient quantity.

Mix.

BLONDE POMMADE.

(Christiani.)

Soft body 1 pound.

Yellow-lake, a sufficient quantity.

Mix. Perfume as desired.

COMPLEXION-WASH (LAIT-VIRGINAL).

Tincture of benzoin $\frac{1}{2}$ ounce.

Tincture of vanilla 2 drachms.

Rose-water $1\frac{1}{2}$ pints.

Mix. Add the water very slowly to the tincture, in order to ensure a perfectly milky emulsion which will not precipitate.

COMPLEXION-WASH

Rose-water 4 ounces.

Orange-flower water 4 ounces.

Borax $2\frac{1}{2}$ drachms.

Tincture of benzoin 1 ounce.

This is a serviceable prescription, especially to give the skin a fresh and healthy appearance in a dry or oily condition of the face or hands.

DENTIFRICE.

Heavy carbonate of magnesia 7 ounces.

Precipitated chalk 24 ounces.

Powdered orris-root 4 ounces.

Fresh powdered Castile-soap 4 ounces.

Carmine 20 grains.

Oil of clover 2 drachms.

Oil of cinnamon 1 drachm.

Oil of origanum 2 drops.

Oil of geranium 1 drachm.

Oil of rose 1 drachm.

Essence of musk 1 drachm.

Mix well and pass several times through a fine drum sieve.

TOOTH-POWDER (QUININE).

Precipitated chalk 2 pounds.

Powdered starch 1 pound.

Powdered orris-root 1 pound.

Sulphate of quinine 2 drachms.

Mix.

DENTIFRICE (ANTISEPTIC).

Powdered orris-root	3 drachms.
Powdered liquorice	2 drachms.
Fresh powdered Castile-soap	5 drachms.
Precipitated chalk	1 ounce.
Boric acid	2 drachms.
Benzoic acid	20 grains.
Oil of eucalyptus	40 drops.
Oil of rose	10 drops.
Oil of peppermint	10 drops.
Oil of lemon	20 drops.
Heavy carbonate of iron enough to make altogether	4 ounces.

Mix the ingredients in the order as given above, and pass the product through a fine drum-sieve. If color be wished, add 20 grains of carmine for an elegant tint.

DENTIFRICE (FRENCH).

Powdered camphor	16 ounces.
Precipitated chalk	5 pounds.
Carmine	1½ drachms.
Oil of rose	2 drachms.

Mix. After being thoroughly mixed, pass through a fine drum-sieve. To bring out the beautiful color of the dentifrice, it should be passed through the sieve twenty times.

DENTIFRICE (CAMPHOR-CHALK).

Precipitated chalk	2 pounds.
Powdered orris-root	1 pound.
Powdered camphor	½ pound.

Mix. The camphor should be first rubbed up in a mortar with a little alcohol before being mixed with the other ingredients. On account of the volatility of camphor, the powder should be kept in a tight box.

TOOTH-POWDER (SEPIA).

Powdered cuttle-fish bone	1 pound.
Precipitated chalk	2 pounds.
Powdered orris-root	1 pound.
Oil of lemon	2 ounces.
Oil of neroli.....	½ drachm.

Mix.

TOOTH-POWDER (PERUVIAN BARK).

Finely powdered Peruvian bark.....	9 ounces.
Precipitated chalk	18 ounces.
Finely powdered oyster shells.....	9 ounces.
Powdered myrrh	5½ ounces.
Oil of peppermint	2½ drachms.

Mix.

TOOTH-POWDER (BORAX-AND-MYRRH).

Precipitated chalk	2 pounds.
Powdered borax	1 pound.
Powdered myrrh	$\frac{1}{2}$ pound.
Powdered orris-root	$\frac{1}{2}$ pound.
Mix.	

TOOTH-POWDER (ROSE).

Precipitated chalk	2 pounds.
Powdered orris-root	1 pound.
Carmine	$\frac{1}{2}$ ounce.
Oil of rose	2 drachms.
Oil of sandal-wood	$\frac{1}{2}$ drachm.
Mix.	

DENTIFRICE (REID'S ANTISEPTIC LIQUID).

Thymol	2 grains.
Carbolic acid	5 drops.
Oil of sassafras	8 drops.
Oil of wintergreen	8 drops.
Oil of rose-geranium	8 drops.
Oil of eucalyptus	3 drops.
Oil of calamus	5 drops.
Oil of <i>pinus pumilis</i>	20 drops.
Glycerine	2 ounces.
Alcohol	$4\frac{1}{2}$ ounces.
White Castile-soap	2 drachms.
Distilled water enough to make.....	16 ounces.
Phosphate of lime	enough.
Caramel and tincture of eudbear.....	enough.

Mix. Dissolve the soap in five ounces of warm water. Dissolve the acids and oils in the alcohol, and add them to the soap solution. Filter through paper containing a small quantity of phosphate of lime. Add glycerine.

DENTIFRICE (RUSHMERE LIQUID).

Ground soap-bark	2 ounces.
Glycerine	$1\frac{1}{2}$ ounces.
Salicylate of sodium	2 drachms.
Oil of bergamot	$\frac{1}{2}$ drachm.
Oil of wintergreen	$\frac{1}{2}$ drachm.
Oil of cloves	10 drops.
Alcohol	1 ounce.
Solution of carmine	enough.
Dilute alcohol, enough to make, all told.....	16 ounces.

Macerate the soap-bark with the diluted alcohol and glycerine, then strain. To the strained liquids add the oils dissolved in alcohol. To this add the salicylate of sodium and a sufficient solution of carmine to color. Shake thoroughly, and filter through wet tale, returning the first portion of the filtered liquids while it runs clear, and add enough dilute alcohol through the filter to make the amount, all-told, one pint.

TOOTH-POWDER (PERUVIAN BARK).

Finely powdered Peruvian bark	1 pound.
Carbonate of ammonia	2 pounds.
Powdered orris-root	2 pounds.
Powdered cinnamon	1 pound.
Powdered myrrh	1 pound.
Precipitated chalk	1 pound.
Oil of cloves	½ ounce.

Mix.

DENTIFRICE (EAST INDIA LIQUID).

Shavings of white Castile-soap.....	12 ounces.
Carbonate of potash	2½ ounces.
Powdered rhatanay	1 ounce.
Glycerine	30 ounces.
Sugar	30 ounces.
Water	enough.
Alcohol	1 gallon.
Oil of true cinnamon	½ ounce.
Oil of gaultheria	6 drachms.
Oil of aniseed	6 drachms.
Oil of cloves	½ ounce.
Oil of peppermint	½ ounce.

Mix. Put the soap in one gallon of cold water and add the carbonate of potash. Dissolve the oils in the alcohol. Add the sugar, glycerine, and rhatanay to one gallon of cold water, and to the mixture add the soap solution and the oils' solution. Lastly, add cold water to make a five-gallon mixture all-told. Shake daily for two weeks, then leave undisturbed for two weeks. Draw off the clear part of the solution and filter the rest.

TOOTH-PASTE (RUBY).

Powdered Castile-soap	2 ounces.
Powdered orris-root	6 ounces.
Precipitated chalk	6 ounces.
Honey	6 ounces.
Powdered cuttle-fish bone	2 ounces.
Powdered pumice-stone	1 ounce.
Powdered catechu	½ ounce.
Powdered cinchona	½ ounce.
Oil of cloves	½ ounce.
Oil of wintergreen	½ ounce.
Oil of nutmeg	½ ounce.
Glycerine enough to make paste.	
Solution of carmine enough to color.	

Mix. The essential oils should be rubbed up with the dry powder.

DENTIFRICE (TANNIN).

Sugar of milk	32	ounces.
Carmine	150	grains.
Pure tannin	1/2	ounce.
Oil of peppermint	20	drops.
Oil of aniseed	20	drops.
Oil of orange-flowers.....	10	drops.

Mix. Blend the carmine with the tannin, add the sugar of milk gradually, and finally the oils.

TOOTH-PASTE (SOAP-BARK AND ARECA).

Precipitated chalk	8	ounces.
Powdered orris-root	8	ounces.
Powdered areca	2	ounces.
Powdered cuttle-fish bone.....	2	ounces.
Powdered quillaia	1	ounce.
Powdered borax	1	ounce.
Oil of cloves	40	minims.
Oil of nutmeg	40	minims.
Oil of bitter almonds.....	30	minims.
Oil of rose	40	minims.

Mix. Add enough glycerine, honey, and mucilage to make a paste. Add the oils last, and color with a solution of carmine.

DENTIFRICE (WILD CHERRY).

Precipitated chalk	4	pounds.
Powdered orris-root	4	ounces.
Powdered soap	1	ounce.
Fluid extract of wild-cherry.....	8	ounces.
Infusion of red-rose leaves.....	12	ounces.
Oil of wintergreen	1/2	drachm.
Essential oil of almonds.....	8	drops.
Glycerine, (one part to two parts of water).....	12	ounces.

Mix.

CREAM (ANTISEPTIC DENTAL).

Precipitated chalk	5	drachms.
Powdered white Castile-soap	1	drachm.
Salicylate of soda	30	grains.
Oil of rose-geranium	4	drops.
Oil of wintergreen	4	drops.
Solution of carmine	2	drops.
Glycerine	4	drops.

Mix. For this recipe was awarded prize by "The Pharmaceutical Record."

As the following recipes are for emulsions it will be well, first of all, to explain what constitutes an emulsion. It is an intimate mixture of a fatty substance with water, where they are prevented by some viscid substance from separating. Cosmetically it protects the skin and renders it soft and smooth.

EMULSION (ROSE).

Blanched Valentia almonds	8 ounces.
Rose-water	1 $\frac{1}{4}$ pints.
Alcohol (ninety-five degrees)	14 ounces.
Oil of rose	1 $\frac{1}{4}$ drachms.
Spermaceti	$\frac{1}{2}$ ounce.
White wax	$\frac{1}{2}$ ounce.
Castile soap	$\frac{1}{2}$ ounce.

Mix. The soap is pared and placed in a kettle which can be heated in a water-bath. From two to three ounces of rose-water are added to and heated with the soap until it is completely dissolved. The wax and the spermaceti are then added while the mixture is gently stirred. Boiling water having been poured over the shelled almonds, and then made into a paste in a clean mortar, they are rubbed up with the remainder of the rose-water. The almond mixture is then, without pressure, strained through wash-muslin. The soap-solution is then placed in the mortar and the almond mixture slowly added and carefully mixed with it. After all the milk of almonds has been added, the alcohol in which the oil of rose has been dissolved is emptied into the mortar. The alcohol must be added slowly, or else it will cause the milk of almonds to coagulate. The first mixture must be made without the aid of heat. Finally, it is strained and allowed to stand for twenty-four hours.

EMULSION (ROSE).

White soap	$\frac{1}{2}$ ounce.
Blanched almonds	2 ounces.
Liquid carmine	10 drops.
Rose-water	1 pint.

Mix.

EYEBROW-PENCIL.

Suet	1 pound.
Curd-soap	$\frac{1}{2}$ pound.
Ivory-black, a sufficient quantity.	

Mix.

EYE WASH.

Camphor water	1 ounce.
Infusion of sassafras-pith	2 ounces.
Powdered borax	3 grains.
Cocaine hydrochlorate	$\frac{1}{2}$ grain.

Mix. Directions: Drop in the eye frequently for congestion or inflammation.

EYE-LID PASTE (KOHL).

(Christiani.)

When camphor is burned and the smoke condensed and collected, it can be formed into a paste and used as the Eastern ladies do, by applying it to the eyelids, in order to give a brilliant effect to the eyes.

GLYCERINE-BALSAM.

White wax	1 ounce.
Spermaceti	1 ounce.
Glycerine	1 ounce.
Oil of almonds	8 ounces.
Oil of rose	½ drachm.

Mix.

GLYCERINE FRAGRANT CREAM.

Flaxseed	2 ounces
Salicylic acid	2 grains.
Glycerine	12½ ounces.
Alcohol	2½ ounces.
Carbolic acid	1 drachm.
Cologne	1½ drachms.
Water	1½ ounces.

Mix. This recipe is valuable for rough and irritable skin. Make a mucilage by steeping the flaxseed in the water for three days, with frequent shaking, and then strain through muslin. Dissolve the salicylic acid in the alcohol, and to the product add the glycerine and the other ingredients. Shake well and let the whole stand for twenty-four hours. Strain through muslin and bottle. Quince-seed mucilage may be substituted to advantage for that made with the flaxseed and water.

GLYCERINE-BALSAM.

Glycerine	20 ounces.
Alcohol	8 ounces.
Otto of rose	16 drops.
Distilled water, enough to make.....	80 ounces.

Mix. Add solution of rosaniline sufficient to give a faint pink tinge to the mixture. Useful for pale and irritable skin.

GLYCERINE-LOTION.

Glycerine	1 ounce.
Tincture of arnica	1 ounce.
Rose-water	1 ounce.
Alcohol	1 ounce.
Aromatic spirits of ammonia	1 ounce.

Mix. Valuable to employ in fœtid odor of the skin.

GLYCERINE-CREAM.

Glycerine	6 ounces.
Powdered tragacanth (or enough to thicken the mixture)	1/2 ounce.
Extract of cassia	1/2 ounce.
Powdered borax	1/2 ounce.
Powdered Florentine orris-root	1 ounce.
Extract of jasmine	2 drachms.

Mix. This is a good preparation for healing a skin roughened by sun and wind. Mix the extracts with the powdered orris-root. Dissolve the borax in the glycerine, and mix them with the tragacanth, adding the extract and orris-root with thorough blending. Put the mixture in collapsible tubes or in wide-mouthed vials.

GLYCERINE OR BOROGLYCERIDE CREAM.

Boric acid	1 part.
Glycerine	24 parts.
Anhydrous lanolin	5 parts.
Vaseline	70 parts.

Mix. Dissolve the boric acid in the glycerine and add the lanolin and vaseline. Perfume and tint to suit. For cracks and chaps of the skin, especially in irritable lips.

GLYCERINE-JELLY (PLAIN).

Thin French gelatine	1/2 ounce.
Glycerine of borax	10 ounces.
Triple rose-water	6 ounces.
Water	5 ounces.

Mix. Soak the gelatine in the water all night in a gallipot, and next morning place the pot in a saucepan with water, and heat until the gelatine is dissolved. Then add the glycerine and the rose-water. The preparation may be colored with a little cochineal or saffron. Serviceable in greasy and rough skin.

GLYCERINE-JELLY (CARBOLATED).

Isinglass	1 ounce.
Glycerine	16 ounces.
Carbolic acid	1 drachm.
Water	3 ounces.

Mix. Prepare in the same manner as described above. To be used in similar conditions as above formula.

GLYCERINE-JELLY (SOLID).

French gelatine	20 grains.
Glycerine	1 1/2 ounces.
Otto of roses	1 drop.
Water	1/2 ounce.

Mix. Make up as before, adding the otto of roses when the jelly is lukewarm, and pour into moulds.

When applied undiluted to chapped skin, and sometimes even to sound skin, glycerine irritates instead of benefitting it. It is therefore advisable to mix the glycerine with water or with some fatty substance.

GLYCERINE-LOTION (BORATED).

Boric acid	1 ounce.
Glycerine	20 ounces.
Orange-flower water	16 ounces.
Alcohol	12 ounces.
Distilled water, enough to make.....	1 gallon.

Mix. Useful in dandruff and irritable skin.

GLYCERINE-CREAM.

Powdered tragacanth	1 ounce.
Orange-flower water	3 ounces.
Glycerine	5 ounces.
Tincture of benzoin	1 ounce.
Boric acid	½ ounce.
Oil of roses	8 drops.

Mix. Make into a paste. It may, on retiring, be rubbed into a rough or inflamed skin, and washed off in the morning.

GLYCERINE COLD CREAM.

Arrow-root	1 ounce.
Orange-flower water	1 ounce.
Glycerine	22 ounces.
Oil of rose	15 drops.
Oil of neroli	15 drops.
Extract of jasmine	½ ounce.

Mix.

HAIR-LOTION (QUININE-AND-GLYCERINE).

Cologne	2 ounces.
Sulphate of quinine	15 grains.
Tincture of cantharides	2 drachms.
Borax	1 drachm.
Ammonia-water	1 drachm.
Glycerine	3 ounces.
Tincture of sacchar	1 drachm.
Bay-rum enough to make, all told.....	1 pint.

Mix and filter.

HAIR-OIL (LEMON).

Olive oil	2 pints.
Oil of bergamot	1½ ounces.
Oil of lemon	1 ounce.
Oil of cloves	½ ounce.
Oil of cinnamon	¼ drachm.
Oil of neroli	20 drops.
Oil of rose	10 drops.

Mix.

HAIR-LOTION.

Castor-oil	1 ounce.
Oil of bergamot	40 drops.
Glycerine	3½ ounces.
Tincture of cantharides	4 drachms.
Ammonia-water	4 drachms.
Alcohol enough to make, all told	1 pint.

Mix. Dissolve the oils in the alcohol, add the tincture, and gradually add the mixed ammonia and glycerine.

HAIR-LOTION.

Sulphate of quinine	20 grains.
Powdered borax	½ drachm.
Ammonia-water	2 drachms.
Compound tincture of cinchona	½ ounce.
Bay-rum enough to make, all told	4 ounces.

Mix. To one ounce of the bay-rum add the quinine and the borax, and then add another ounce of the bay-rum; gradually add the ammonia, and then enough bay rum to make the four ounces, all told, of liquid. Finally, filter.

HAIR-LOTION.

Powdered borax	2 drachms.
Tincture of cantharides	½ ounce.
Aromatic spirit of ammonia	½ ounce.
Glycerine	2 ounces.
Extract of Japanese lilac	1 drachm.
Bay-rum	2 ounces.
Sage-tea, enough to make, all told	1 pint.

Mix. Take one ounce of sage and steep it in a pint of soft water; filter, and dissolve the borax in the tea, then add all the other ingredients.

HAIR-LOTION (QUININE).

Sulphate of quinine	½ drachm.
Alcohol	2 ounces.
Tincture of cantharides	1 drachm.
Tincture of capsicum	½ drachm.
Ammonia-water	4 drachms.
Glycerine	1 ounce.
Bay-rum enough to make, all told	6 ounces.

Mix.

HAIR-LOTION (CROWN).

Tincture of capsicum	3	drachms.
Tincture of cantharides	3	drachms.
Aromatic spirits of ammonia	1½	ounces.
Oil of lavender	1	drachm.
Tincture of cinchona	2	ounces.
Alcohol enough to make, all told	16	ounces.

Mix.

HAIR-LOTION (QUINO-JABORANDI).

Fluid extract of jaborandi	1	ounce.
Sulphate of quinine	20	grains.
Glycerine	2	ounces.
Cologne	4	ounces.
Bay-rum	4	ounces.
Rose-water	20	ounces.

Mix.

HAIR-CURLING FLUID.

Quince-seed juice	3	ounces.
Tragacanth	2	drachms.
Boric acid	2	drachms.
Spirit of camphor	½	ounce.
Water	3	ounces.

Mix. Upon retiring for the night, apply to the hair with the hand or with a soft sponge, after which roll the hair over paper with hairpins.

HAIR-LOTION.

Tincture of Spanish-fly	1	ounce.
Spirit of rosemary	1	ounce.
Oil of sweet almonds	4	ounces.
Oil of lavender	20	drops.
Oil of bergamot	40	drops.
Oil of rose	8	drops.

Mix. To be applied every other morning, shaking the bottle well before using.

LANOLIN-MILK.

This preparation is made by simply rubbing together fifteen grains of borax with one hundred and fifty grains of lanolin, and gradually adding twenty-five drachms of orange-flower water.

LANOLIN-CREAM.

Anhydrous lanolin	2½	drachms.
Benzoated lard	45	grains.

Mix.

LANOLIN-CREAM.

Anhydrous lanolin	3 drachms.
Yellow vaseline	1 drachm.
Oil of rose	5 drops.
Tincture of vanilla	5 drops.
Spirit of mignonette	10 drops.
Mix.	

LANOLIN-CREAM.

Oil of citron	1 drop.
Oil of bergamot	3 drops.
Spirit of mignonette	8 drops.
Anhydrous lanolin	2½ drachms.

Mix.

LANOLIN-CREAM.

Anhydrous lanolin	2½ drachms.
Oil of almonds	8 drops.
Oil of cacao	8 drops.
Benzoic acid	1½ grains.

Lanolin creams are of service for all dry and irritable conditions of the skin, and for all sores, especially bed-sores.

MAY-DEW MILK.

Red-rose leaves	2 ounces.
Borax	½ ounce.
Glycerine	1 ounce.
Tincture of benzoin	1 ounce.
Rose-water	1½ pints.

Mix.

MILK OF ELDER-FLOWERS.

Hulled sweet almonds	4 ounces.
Elder-flower water	14 ounces.
Alcohol (ninety-five degrees)	8 ounces.
Oil of bitter almonds	½ drachm.

Mix.

MILK OF DANDELION.

Hulled sweet almonds	4 ounces.
Rose-water	14 ounces.
Juice of dandelion root	1 ounce.
Extract of tuberose	8 ounces.
Green oil	½ ounce.
Wax	½ ounce.
Curd soap	½ ounce.

Mix. The dandelion must be fresh.

MILK OF BITTER ALMONDS.

Hulled bitter almonds	9 ounces.
Distilled water or rose-water	1½ pints.
Alcohol (ninety-five degrees)	10½ ounces.
Oil of bitter almonds	½ drachm.
Oil of bergamot	2 drachms.
Wax	½ ounce.
Spermaceti	½ ounce.
Oil of almonds	½ ounce.
Curd soap	½ ounce.

Mix.

MILK OF BITTER ALMONDS.

Blanched bitter almonds	4 ounces.
Orange-flower water	12 ounces.
Curd soap	½ ounce.
Alcohol (sixty-five degrees)	4 drachms.
Oil of almonds	20 drops.
Oil of bergamot	1 drachm.

Mix. Dissolve the soap in a water-bath apparatus with the orange-flower water, heat the almonds in a clean marble mortar, gradually adding the soap and water. Strain through muslin, and return the product to the mortar, and while gradually stirring it add the alcohol in which the oils have been dissolved.

MILK OF BITTER ALMONDS.

Blanched sweet almonds	5 ounces.
White Castile-soap	2 drachms.
White wax	2 drachms.
Spermaceti	2 drachms.
Oil of bitter almonds	20 drops.
Oil of bergamot	40 drops.
Alcohol	6 ounces.

Water (a sufficient quantity).

Mix. The almonds should be beaten in a smooth mortar, and the water gradually added in small quantities, the beating in the mortar being continued until a smooth paste is obtained. Add gradually to this paste one pint of water, stirring well all the time. The emulsion thus made should be strained without pressure through clean cotton cloth. Add through the strainer enough water to bring the amount of the liquid to one pint. The soap, shaved into thin slices, should be at the same time, with enough water to cover it, melted directly over a very gentle fire or in a water-bath. When liquid, the wax and spermaceti should be added to it in large pieces, in order to have them melt slowly and thereby become better incorporated with the soap, and the mixture should be stirred occasionally. This soapy mixture being put into the mortar, the emulsion should be slowly poured into it, while the pestle is kept in movement constantly to secure perfect blending of the whole liquid. Lastly, add the alcohol, in which the perfumes have been previously dissolved.

MILK OF CUCUMBER.

Sweet almonds	4	ounces.
Cucumber juice	14	ounces.
Alcohol (ninety-five degrees)	8	ounces.
Essence of cucumber	3½	ounces.
Green oil	2	drachms.
Wax	2	drachms.
Curd soap	2	drachms.
Mix.		

MAGNOLIA-BALM.

Florida-water	1	ounce.
Alcohol	1	ounce.
Rose-water	2	ounces.
Glycerine	½	ounce.
Prepared chalk	2	ounces.
Oxide of zinc	1	ounce.
Water	2	ounces.

Mix. Tint with carmine, if desired. A very good toilet water.

NAIL AND LIP POMÅDE (ROSALINE).

(*Pharmaceutical Era.*)

Eosin	10	parts.
Spermaceti	30	parts.
White wax	30	parts.
Vaseline	410	parts.

Mix. For communicating a rose-tint to the nails and lips.

MOUTH-WASH (DISINFECTANT).

Thymol	3	grains.
Benzoic acid	40	grains.
Tincture of eucalyptus	3	drachms.
Essence of peppermint	10	drops.
Alcohol	3	ounces.

Mix. Pour enough into a glassful of water to make it turbid.

MOUTH-WASH (HORSE-RADISH).

Horse-radish root (ground)	1	ounce.
Boiling water	1	pint.
Tincture of rhatany	2	drachms.

Mix.

MOUTH-WASH (HONEY).

Gum myrrh	2	drachms.
Gum-Arabic	1	drachm.
Alcohol	½	drachm.
Water	7½	drachms.

Mix.

MOUTH-WASH (MENTHOLINE).

Menthol	40	grains.
Oil of cloves	1½	drachms.
Oil of peppermint	1½	drachms.
Boric acid	9	drachms.
Tincture of myrrh.....	4½	ounces.
Tincture of cudbear.....	2	ounces.
Alcohol enough to make, all told.....	36	ounces.

Mix. Dissolve the menthol and the boric acid in twenty ounces of alcohol, add the oils and the tinctures, filter, and add enough alcohol to make the thirty-six ounces.

MOUTH-WASH (COSMOS).

Saccharin	37½	grains.
Benzoic acid	45	grains.
Tincture of krameria	½	ounce.
Absolute alcohol	25	drachms.
Oil of peppermint	15	drops.
Oil of cinnamon	15	drops.

Mix. Add three parts of the mixture to twenty-seven parts of a 4-per-cent. solution of peroxide of hydrogen.

MOUTH-WASH (VIOLET).

Tincture of violet-root	7	ounces.
Spirit of rose	7	ounces.
Alcohol	7	ounces.
Oil of bitter almonds.....	5	drops.

Mix. Use a teaspoonful in a glassful of warm water.

MOUTH-WASH.

Permanganate of potash	5	grains.
Distilled water	1	ounce.

Mix.

MOUTH-WASH.

Infusion of sage	8	ounces.
Pure glycerine	1	ounce.
Tincture of myrrh	3	drachms.
Solution of chlorate of soda.....	1	ounce.

Mix.

MOUTH-WASH.

Salol	8	grains.
Alcohol	8	grains.
Tincture of cinnamon	90	drops.
Oil of mint	4	drops.

Mix. This can also be used for a dentifrice and for receding gums.

MOUTH-WASH.

Saccharin	15 grains.
Bicarbonate of sodium	15 grains.
Salicylic acid	1 drachm.
Aleohol	6 ounces.

Mix. A few drops of the mixture are used in a glassful of water as a gargle.

MOUTH-WASH.

Bromo-chloral	20 to 30 drops.
Syrup	1 teaspoonful.

Mix. This preparation is recommended as excellent for removing the odor of smoking from the breath.

MOUTH-WASH (DISINFECTANT).

Benzoic acid	1 drachm.
Tincture of eucalyptus	5 drachms.
Absolute alcohol	4 ounces.
Oil of peppermint	10 drops.

Mix.

Perfumed powders are useful and agreeable. They neutralize excessive moisture of the skin, whether derived from superabundance on it of perspiration or of oil.

PERFUMED POWDER.

Powdered Florentine orris-root	4 ounces.
Powdered talc	12 ounces.
English precipitated chalk	4 pounds.
Powdered boric acid	2½ ounces.
Extract of cassia	½ ounce.
Extract of jasmine	½ ounce.
Extract of white rose	2 drachms.

Mix thoroughly and sift through fine bolting-cloth.

PERFUMED POWDER.

Subnitrate of bismuth	1 ounce.
Heavy carbonate of magnesia	1 ounce.
Starch powder	4 ounces.
French chalk	2 ounces.
Otto of roses	16 drops.

Mix.

VIOLET-POWDER.

Cornstarch	12	pounds.
Powdered orris-root	2	pounds.
Oil of citron	$\frac{1}{2}$	ounce.
Oil of bergamot	$2\frac{1}{2}$	drachms.
Oil of cloves	2	drachms.

Mix.

ROSE-POWDER.

Finest rice-flour	14	pounds.
Oil of rose	5	drachms.
Oil of sandal-wood	5	drachms.

Mix. If a pink color be desired, it can be obtained by the addition of one and a quarter drachms of the best carmine.

PEARL POWDER.

Venetian chalk	2	pounds.
Subnitrate of bismuth	2	ounces.
Oxide of zinc	2	ounces.

Mix.

Inasmuch as this powder contains metallic substances it must be used with caution, as it is capable of causing a brownish discoloration of the skin.

FACE-POWDER (WHITE ROSE).

Oxide of zinc	7	ounces.
Powdered talc	9	ounces.
Carbonate of magnesia	1	ounce.
Triple extract of jasmine	25	drops.
Triple extract of white-rose	10	drops.

Mix thoroughly and pass through fine bolting-cloth.

FACE-POWDER (RED ROSE).

Oxide of zinc	7	ounces.
Purified talc	9	ounces.
Carbonate of magnesia	1	ounce.
Triple extract of jasmine	25	drops.
Triple extract of rose	10	drops.

Solution of carmine

17 drops.

Mix thoroughly and pass through fine bolting-cloth.

FACE-POWDER (CUBAN BELLE).

White-rose face-powder	4	ounces.
Red-rose face-powder	4	ounces.
Oxford ochre	4	drachms.

Mix thoroughly and pass through fine bolting-cloth. For brunette complexion.

FACE-POWDER (FLEUR-DE-LYS).

Bismuth subnitrate	$\frac{1}{2}$	drachm.
Purified talc	$1\frac{1}{2}$	ounces.
Wheat-starch	2	ounces.
Gypsum	3	ounces.
Triple extract of fleur-de-lys.....	1	drachm.

Mix thoroughly and pass through fine bolting-cloth.

FACE-POWDER (NILE-LILY).

Bismuth subcarbonate	2	drachms.
Oxide of zinc	2	ounces.
Purified talc	$2\frac{1}{2}$	ounces.
Precipitated chalk	$2\frac{1}{2}$	ounces.
Wheat-starch	$3\frac{1}{2}$	ounces.
Oil of geranium	20	drops.

Mix thoroughly and pass through fine bolting-cloth.

FACE-POWDER (RICE).

Finely powdered rice	$3\frac{1}{2}$	ounces.
Powdered orris-root	1	ounce.
Oil of rose-geranium	10	drops.

Mix thoroughly and pass through fine bolting-cloth.

WHITE COMPLEXION POWDER.

Powdered rice	1	ounce.
Powdered talcum	1	ounce.
Powdered carbonate of magnesia.....	1	drachm.
Ext. rose	3	drops.

Mix.

PINK COMPLEXION POWDER.

Powdered starch	1	ounce.
Powdered carbonate of zinc.....	$2\frac{1}{2}$	drachms.
Powdered carbonate of magnesia.....	1	drachm.
Carmine, sufficient quantity to color pink.		

Mix. Starch, rice, and zinc, or magnesia alone, colored pink, make good and useful complexion dusting powders.

FACE-POWDER (SWANSDOWN).

Oxide of zinc	8	ounces.
Powdered orris-root	$2\frac{1}{2}$	ounces.
Purified talc	10	ounces.
Extract of musk	12	drops.
Extract of jasmine	40	drops.
Extract of white-rose	40	drops.
Extract of cassia	40	drops.

Mix thoroughly and pass through fine bolting-cloth.

COMPLEXION POWDER.

Corn-starch	5 pounds.
Precipitated chalk	3 pounds.
Powdered tale	2 pounds.
Oil of neroli	1 drachm.
Oil of citron	1 drachm.
Oil of orange	2 drachms.
Extract of jasmine	1 ounce.
Mix.	

HAND-POWDER.

(Christiani.)

Powdered white Castile soap.....	4 ounces.
Powdered cuttle-fish bone	4 ounces.
Bleached almonds	8 ounces.
Powdered orris-root	2 ounces.
Oil of cloves	½ drachm.
Oil of lavender	1 drachm.

Mix. Use as soap-powder.

WHITENING SKIN-POWDER.

(Christiani.)

Powdered marshmallow root	2 ounces.
Carbonate of soda	2 ounces.
Barley-meal	12 ounces.

Mix. Use as soap-powder.

NAIL-POWDER.

A cosmetic preparation for treatment of the finger-nails consists of finely-powdered oxide of tin, to which may be added a little oil of lavender or other agreeable perfume. It may be colored with carmine and can be applied by hand or with a nail-polisher.

The following recipes for dusting-powders for the skin of infants have been collected from various trustworthy sources:—

INFANT-POWDER.

Purified tale	8 ounces.
Powdered fuller's earth	4 ounces.
Lycopodium	4 ounces.
Oil of rose	5 drops.

Mix. Rub the oil of rose into the fuller's earth in a mortar until they are thoroughly incorporated with each other. Then add the tale and lycopodium, mixing thoroughly. Pass through fine bolting-cloth.

INFANT-POWDER.

Powdered French chalk	14	ounces.
Powdered boric acid	2	ounces.
Extract of jasmine	1½	drachms.
Extract of musk	½	drachm.

Mix. Pass through fine bolting-cloth.

INFANT-POWDER.

Gum camphor	½	ounce.
Carbolic acid	15	drops.
Oxide of zinc	¾	ounce.
English precipitated chalk	2	ounces.
Oil of rose	2	drops.

Mix. Rub the camphor to a fine powder in a mortar. Use alcohol to reduce it to liquid form, and mix the other components thoroughly. Pass through fine bolting-cloth.

INFANT-POWDER.

Kaolin	1	pound.
Powdered orris-root	4	ounces.
Oil of sandal-wood	40	drops.

Mix. Pass through fine bolting-cloth.

INFANT-POWDER.

Carbolic acid	50	drops.
Boric acid	1½	ounces.
Powdered French chalk	14½	ounces.

Mix thoroughly the French chalk, with the carbolic acid gradually added. Then add the boric acid, and thoroughly mix all together. Pass through fine bolting-cloth.

INFANT-POWDER.

Oxide of zinc	½	ounce.
Powdered starch	1½	ounces.
Boric acid	20	grains.
Oil of eucalyptus	10	drops.

Mix.

INFANT-POWDER.

Powdered fuller's earth	9	ounces.
Powdered boric acid	1½	ounces.
Powdered oxide of zinc	3	ounces.
Powdered starch	9	ounces.
Powdered orris-root	1½	ounces.
Oil of bergamot	2	drachms.

Mix the powders thoroughly together and pass the mixture through fine bolting-cloth.

"The Druggist's Circular and Chemical Gazette" gives the following formulae for talc powders:—

PERFUMED TALC.

Powdered talc	1 pound.
Extract of jasmine	$\frac{3}{4}$ ounce.
Extract of musk	$\frac{3}{4}$ ounce.
Oil of rose	8 drops.
Mix.	

BORATED TALC.

Powdered talc	1 pound.
Powdered boric acid	1 pound.
Mix. This powder is beneficially used for healing reddened and cracked skin.	

TANNATED TALC.

Powdered talc	5 pounds.
Tannic acid	4 ounces.
Mix. Tannated talc is a serviceable application for excoriated and suppurating surfaces.	

SALICYLATED TALC.

Powdered talc	5 pounds.
Salicylic acid	3 ounces.
Mix. This preparation is of value for preventing and curing offensive perspiration.	

CARBOLATED TALC.

Powdered talc	1 pound.
Carbolic acid	$\frac{1}{4}$ ounce.
Mix. Carbolated talc is a good antiseptic preparation. With the use of the same proportions as for carbolated talc, mentholated and thymolated talc may be prepared.	

AROMATIC VINEGAR.

Glacial acetic acid	8 ounces.
Oil of lavender	2 drachms.
Oil of rosemary	1 drachm.
Oil of cloves	1 drachm.
Camphor	1 ounce.

Mix. The powdered camphor is first dissolved in the acetic acid, the essential oils are then added; the mixture is set aside for several days, but frequently shaken, and finally it is filtered.	
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HYGIENIC VINEGAR.

Tincture of benzoin	1 pint.
Oil of cloves	1 drachm.
Oil of lavender	1 drachm.
Oil of marjoram	½ drachm.
Mix and add acetic acid (thirty degrees)	½ pint.

Mix. Shake well. Let stand for several days, then filter.

COSMETIC VINEGAR.

Tincture of benzoin	2 pints.
Aromatic vinegar	3 ounces.
Peruvian balsam	1 ounce.
Oil of nutmeg	½ drachm.
Oil of neroli	1¼ drachms.

Mix.

COLOGNE-VINEGAR.

Cologne	6¼ ounces.
Glacial acetic acid	2 drachms.

Mix.

TOILET VINEGAR.

(*Pharmaceutical Era.*)

Essence of bergamot	20 minimis.
Essence of ambergris.....	4 drachms.
Essence of vanilla	30 minimis.
Oil of neroli.....	30 minimis.
Strong acetic acid	160 minimis.
Alcohol (eighty-four degrees)	6 ounces.

Mix.

DE BULLY'S VINAIGRE-AROMATIQUE.

Oil of lemon	1 ounce.
Oil of lavender (English)	½ ounce.
Oil of rosemary-flower	¼ ounce.
Oil of cloves	¼ ounce.
Gum camphor	1 ounce.
Tincture of benzoin	2 ounces.
Tincture of orris-root	2 ounces.
Tincture of storax	1 ounce.
Tincture of Tonquin-bean	1 ounce.
Tincture of musk	1 ounce.
Alcohol (ninety-five degrees)	4½ pints.
Acetic acid	1 pint.
Triple rose-water	1½ pints.

Mix. Dissolve the oils and camphor in the alcohol, add the tinctures, then the acid, lastly the rose-water. Let stand a fortnight before filtering.

WIG-PASTE.

(Christiani.)

Isinglass	1 ounce.
Rose-water	8 ounces.
Tincture of benzoin	2 ounces.
White turpentine	2 ounces.
Alcohol	4 ounces.

Mix. The isinglass is dissolved in the rose-water; the turpentine, the tincture, and the two solutions are then mixed.

The appended combinations are serviceable for the diseases and disorders named.

BALDNESS.

Ointment of oleate of mercury (10 to 20 per cent.)	1 ounce.
Ol. eucalyptus	1 drachm.

Mix. Directions: Rub into the bald spots once or twice a day.

BOILS.

Chloral hydrate	10 grains.
Camphor	10 grains.
Phenolis (carbolic acid)	10 drops.
Sublimed sulphur	½ drachm.
Subacetate of lead ointment.....	½ ounce.
Benzoated zinc ointment	½ ounce.

Mix. Apply with old muslin or lint to the boil. Change dressing two or three times a day.

BURNS.

Salol	1 part.
Olive oil	70 parts.
Lime-water	70 parts.

Mix.

BURNS.

Cocaine hydrochlorate	3 grains.
Beechwood creosote	5 drops.
Lime water	3 ounces.
Distilled witch-hazel water	3 ounces.

Mix. Directions: Mop over the surface or apply with old muslin.

BURNS.

Powdered bicarbonate of soda.....	½ ounce.
Subnitrate of bismuth	½ ounce.
Beechwood creosote	5 drops.

Mix. Directions: Dust frequently over the burn.

CARBUNCLE.

Compound resin-ointment	1 ounce.
Powdered opium	2 grains.
Powdered camphor	5 grains.

Mix. Directions: Apply on lint or old muslin to the carbuncle.

CHAPPED LIPS.

Solution of boroglyeeride (50 per cent.)	3 drachms.
Lanolin	4 drachms.
Rose-ointment	4 drachms.

Mix.

CRACKS OR FISSURES OF HANDS, FEET, AND LIPS

Prepared suet	1 ounce.
Rose ointment	1 ounce.
Salicylic acid	30 grains.
Sublimed sulphur	30 grains.

Mix. The suet can be prepared as follows: Melt the fresh suet over a slow fire, add while the suet is fluid from 10 to 30 grains of gum camphor to the ounce of suet. After the camphor and suet have been thoroughly mixed, remove from fire and beat up the whole well, and after cool incorporate with the above combination.

CHAPPED HANDS.

Tannic acid	8 grains.
Glycerine	5 drachms.
Rose-water	6 ounces.

Mix. This prescription is given by Monsieur Vigier, a French physician, in *Le Journal de Medicine*.

CHAPPED HANDS.

Lanolin	3 to 6 ounces.
Vanilla	1½ grains.
Paraffin	3 to 6 drachms.
Essence of rose	1 drop.

Mix.

CHAPPED HANDS.

Green soap	½ ounce.
Tincture of benzoin	2 ounces.
Glycerine	4 ounces.
Rose-water	8 ounces.

Mix.

CHAPPED AND INFLAMED HANDS.

Salol	1 drachm.
Menthol	½ drachm.
Olive oil	1 drachm.
Lanolin	30 drachms.

Mix. Apply two or three times a day.

Salol, an ingredient in the above application, is a combination of carbolic acid and salicylic acid. By virtue of its antiseptic properties, it allays inflammation. Menthol, also an ingredient of the above application, is a constituent of peppermint-oil, and allays pain and itching. The same ingredients also enter into the following preparation:—

CHAPPED HANDS.

Menthol	$\frac{1}{2}$ drachm.
Quince-seed	$\frac{1}{2}$ ounce.
Glycerine	1 ounce.
Alcohol	4 ounces.
Water, a sufficient quantity to make a mucilage..	

The quince-seed is soaked in a pint of water for twenty-four hours, frequently stirred, and then strained with gentle pressure through muslin, and the full volume with water made up to one pint. The glycerine is then added, and finally the alcohol and menthol; the whole being then briskly stirred.

CHAPPED AND INFLAMED SKIN.

Salol	40 grains.
Menthol	10 grains.
Olive oil	1 drachm.
Lanolin	$\frac{1}{2}$ ounce.
Cold cream	$\frac{1}{2}$ ounce.

Mix.

CORNs AND BUNIONS.

Salicylic acid	1 drachm.
Flexible collodion	1 ounce.

Mix and put a camel's hair brush through the cork of the bottle. Directions: Paint over the corn or bunion every day or two.

Salicylic acid plaster can be used in place of the above combination upon corns, bunions, or a thickened state of the skin with great benefit.

DANDRUFF.

Tincture of capsicum	$\frac{1}{2}$ ounce.
Tincture of nux vomica	$\frac{1}{2}$ ounce.
Spirits rosemary	3 ounces.
Distilled witch-hazel water.....	2 ounces.

Mix. Directions: Rub in well with a sponge every night on retiring.

DRY SKIN.

Glycerine	2 ounces.
Lime water	2 ounces.
Distilled witch-hazel water	2 ounces.

Mix. Apply with cotton once or twice a day.

FALLING OF HAIR.

Corrosive sublimate	10 grains.
Chloride of ammonia	2 drachms.
Water of eucalyptus	6 ounces.

Mix. Directions: Rub into the scalp at night on retiring by means of a small sponge or piece of cotton.

FRECKLES.

Horse-radish root	1 ounce.
Boiling water	1 pint.
Borax	2 drachms.

Mix. This lotion is serviceable for removing freckles, tan, etc.

FRECKLES OR LIVER SPOTS.

Chloride of ammonia.....	1 drachm.
Corrosive sublimate	10 grains.
Distilled witch-hazel water.....	3 ounces.
Rose-water	3 ounces.

Mix. Directions: Apply with sponge once or twice a day.

FRECKLES, BLACKHEADS, TAN, ETC.

Solution of ammonia	2 ounces.
Bay rum	2 ounces.
Rose-water	2 ounces.
Powdered borax	2 ounces.
Glycerine	1 ounce.
Distilled water	20 ounces.

Mix.

FRECKLES AND TAN.

Rose-water	6 ounces.
Glycerine	½ ounce.
Bitter almond water.....	2½ drachms.
Tincture of benzoin	2½ drachms.
Borax	1½ drachms.

Mix. This is Dr. Chevasse's preparation for tan, freckles, pimples, etc. Rub the borax up with the glycerine, gradually adding the rose and almond waters, lastly the tincture of benzoin, agitating the mixture all the time. Apply night and morning.

FROSTBITE.

Camphor	10 grains.
Chloral hydrate	20 grains.
Phenol (carbolic acid)	20 drops.
Atropine sulphate	3 grains.
Morphine sulphate	3 grains.
Cocaine hydrochlorate	5 grains.
Alcohol	2 ounces.

Mix. Directions: Apply frequently to the frost-bite by means of cotton or a camel's hair brush.

FROSTBITE.

Compound tincture of benzoin.....	2 ounces.
Phenol (carbolic acid)	1/2 drachm.
Mix. Directions: Paint over the frost-bite once or twice a day.	

ITCHING OF THE SKIN.

Beechwood creosote	10 drops.
Glycerine	3 ounces.
Rose water	3 ounces.
Mix. Directions: Mop frequently over the skin.	

ITCHING PILES OR HÆMORRHOIDS.

Sublimed sulphur	1/2 drachm.
Cocaine hydrochlorate	5 grains.
Atropine sulphate	3 grains.
Camphor	10 grains.
Chloral hydrate	10 grains.
Tannic acid	20 grains.
Benzoated zinc ointment	1 ounce.

Mix. Directions: Apply to the piles once or twice a day after bathing the parts well with hot distilled witchhazel water.

The internal use of 2 to 4 grains of precipitated sulphur, three to four times a day, will assist in relieving all pain.

MOSQUITO-POWDER.

Eucalyptol	5 parts.
Talc	10 parts.
Corn-starch	85 parts.

Mix. This preparation may be rendered even more effective by substituting 50 per cent. or more of the corn-starch by naphtholine.

OILY OR GREASY SKIN, ESPECIALLY OF THE FACE.

Boric acid	1/2 drachm.
Alcohol	1/2 ounce.
Rose-water	5 1/2 ounces.

Mix. Directions: Mop off the surface night and morning with this solution, after which dust over the face rice or complexion powder.

ODOROUS OR STINKING SWEAT, ESPECIALLY OF HANDS, FEET,
ARMPITS AND OTHER PARTS OF THE BODY.

Powdered boric acid	1/2 ounce.
Powdered alum	1/2 ounce.
Oil of eucalyptus.....	20 drops.
Subnitrate of bismuth.....	1 ounce.
Oil of rose	3 drops.
Oil of verbena	5 drops.

Mix. Directions: The surface should first be washed with pure hydrogen dioxide or peroxide of hydrogen, and the powder afterward dusted well upon the parts.

**PIMPLES, BLOTCHES, TETTER, AND IRRITATION
OF THE SKIN.**

Sulphocarbolate of zinc	20 grains.
Oxide of zinc	2 drachms.
Precipitated sulphur	1 drachm.
Cologne	6 drachms.
Glycerine	6 drachms.
Carmine	2 grains.
Rose-water, enough to make, all told.....	6 ounces.

Mix.

PIMPLES ON THE FACE.

Phenolis (carbolic acid)	10 drops.
Salicylic acid	20 grains.
Gum camphor	10 grains.
Benzoated zinc ointment	1 ounce.

Mix. Directions: Apply at bed time.

PROTECTION AGAINST INSECT BITES.

(Western Druggist.)

Acetic ether	5 parts.
Eucalyptol	10 parts.
Cologne	40 parts.
Tincture of pyrethrum	50 parts.

Mix. Dilute with from three to six parts of water before applying to the skin.

REDNESS OF SKIN, SUNBURN, CHAFING.

Powdered carbonate of zinc.....	4 drachms.
Powdered carbonate of magnesia.....	½ drachm.
Lime water	4 ounces.
Glycerine	1 ounce.
Distilled witch-hazel water	1 ounce.

Mix. Directions: Mop frequently over the surface.

RED NOSE AND CHEEKS.

Hydrastine hydrochlorate (colorless)	5 grains.
Oil of chamomile	5 drops.
Oil of eucalyptus	5 drops.
Benzoated zinc ointment.....	1 ounce.

Mix. Directions: Apply to the surface once or twice a day.

SORES OR ULCERS OF THE SKIN.

Powdered red cinchona bark.....	1 ounce.
Subnitrate of bismuth	1 ounce.

Mix. Directions: Wash off the surface with hydrogen dioxide and then dust on the powder once or twice a day.

STINGS OF INSECTS.

Powdered ipecacuanha	$\frac{1}{2}$ ounce.
Alcohol	$\frac{1}{2}$ ounce.
Sulphuric ether	$\frac{1}{2}$ ounce.
Mix.	

STYE LOTION.

Camphor-water	1 ounce.
Muriate of morphine	2 grains.
Mix.	

SUNBURN.

Citric acid	2 drachms.
Crystallized sulphate of iron	18 grains.
Camphor	2 grains.
Elderflower-water	3 ounces.
Mix.	

SWEATING OF HANDS, FEET, AND OTHER PARTS OF THE BODY.

Salicylic acid	2 drachms.
Subnitrate of bismuth	1 ounce.
Powdered talcum	2 ounces.
Mix. Dust well and frequently over the parts.	

TETTER.

Carbonate of potash	1 part.
Olive oil	10 parts.
Oxide of zinc	15 parts.
Starch	15 parts.
Salol	5 parts.
Sulphur	6 parts.
Lanolin	100 parts.

Mix. The preceding is Dr. Saalfeld's prescription.

WARTS AND CORNS.

(*British and Colonial Druggist.*)

Strong acetic acid	1 drachm.
Tincture of iodine	1 drachm.
Mucilage	2 drachms.
Mix.	

WAX IN THE EAR.

Solution of boroglyceride (50 per cent.)	1 ounce.
Glycerine	1 ounce.
Cocaine hydrochlorate	$\frac{1}{2}$ grain.

Mix. Directions: Warm the mixture in a teaspoon over the flame of a lamp, and pour a few drops in the ear several times a day.

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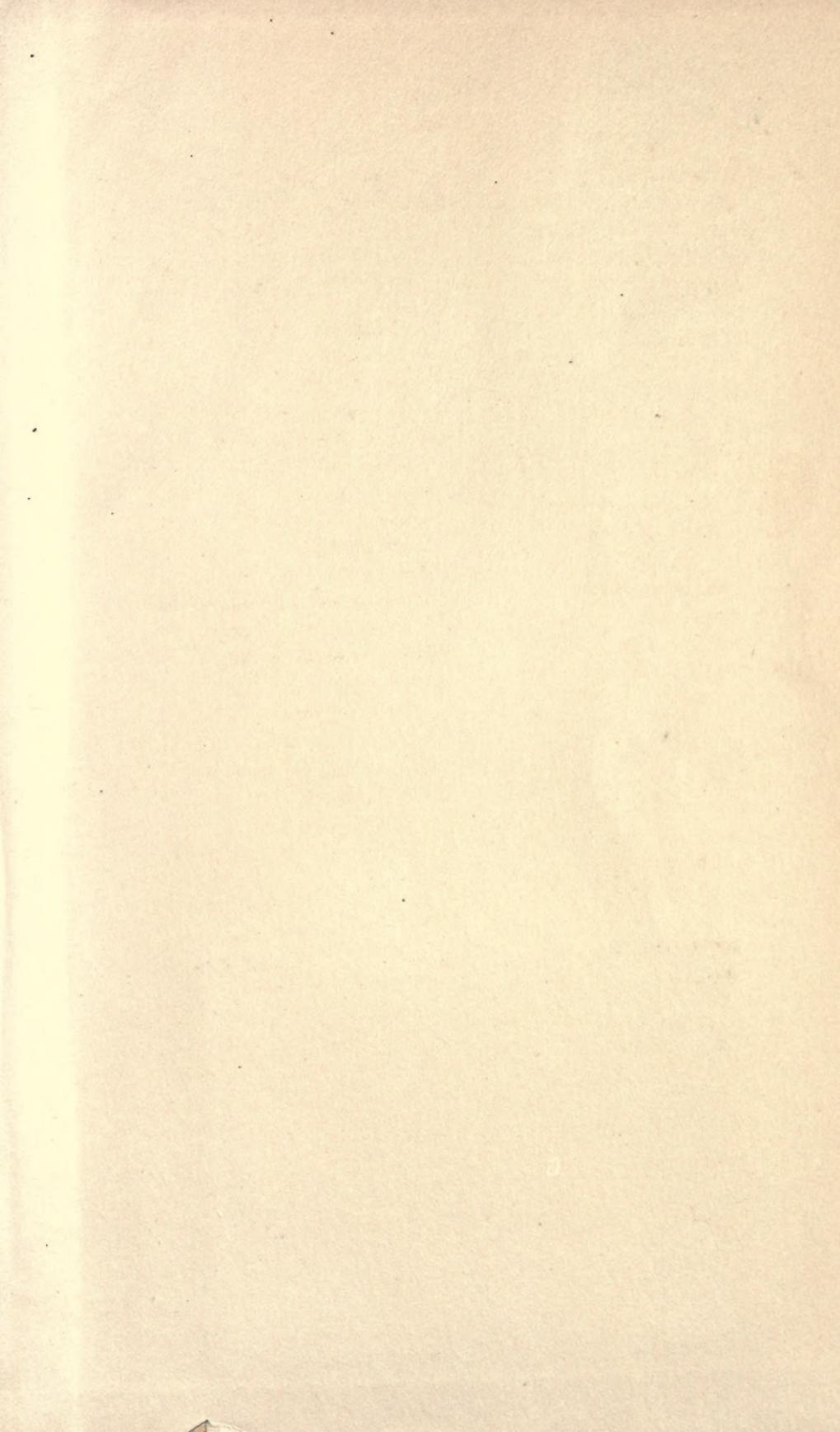
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